ENVIRONMENTAL EDUCATION CURRICULUM
SCOPE AND SEQUENCE PLAN

SCHOOL DISTRICT OF WAUPACA
GRADES K-8

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ABSTRACT

The city of Waupaca and its surrounding communities is growing rapidly. This large influx of people is directly impacting the school system. Along with an increase in the number of students, the school district has also been acquiring outdoor teaching properties. To accommodate the growth in enrollment and utilize the new properties to their full potential it was necessary to establish some sort of organizational format. The evolution of the Environmental Education (EE) Scope and Sequence Plan was the next logical step.

In order for this to happen, key people had to be convinced of the value of such a project. These people included the School District Superintendent, the Director of Instruction, the School Board, the Principals and the teachers.

The project gained acceptance from the school district. Therefore a core committee was composed of dedicated, environmentally conscious members who volunteered their time to develop the Waupaca School District Environmental Education Scope and Sequence Plan. Environmental education goals and objectives were written to encompass kindergarten through eighth grades.

Input from teachers in every grade level was obtained to properly sequence the established objectives. Their expertise not only expedited the process but also gave them ownership in the project.

Dissemination of the EE Scope and Sequence Plan was completed through the inservice of teachers. The EE Scope and Sequence Plan was
introduced and explained to the teachers. Sample activities and resources were also available for review.

The success of this project depends upon several recommendations. An EE resource center at each school needs to be established and allocated a budget. Additional funds need to be available for updating the resources. Activities need to be found or created which will encompass the instructional objectives set forth in the Environmental Education Scope and Sequence Plan. The district should support teachers who will continue the work on the EE curriculum. Evaluations need to be devised that will test student knowledge of EE material presented in the Scope and Sequence Plan. Providing inservices for teachers will increase the infusion of EE.
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Thanks are due to the professors at the UW Stevens Point for helping us gain the insights and skills necessary to educate the future citizens about their responsibility towards the earth. They challenged us to create this Scope and Sequence Plan and to put it into the hands of those important individuals who will shape the minds of the next generations.

Deepest gratitude goes towards our significant others who attended many events solo due to our extensive involvement in this project. Their understanding and support enabled us to develop The Waupaca School District Environmental Education Scope and Sequence Plan which could make a significant contribution to the improvement of the environment.

Finally we would like to thank each other for offering support and encouragement when things became difficult. Without the team effort, this task would have been too enormous to complete.
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CHAPTER I
INTRODUCTION

This is a unique time in history. Use of energy and other resources has increased to the point where humans are no longer mere spectators of earth's processes but have become active players in creating change throughout the world. As humans become more numerous and consume resources more rapidly, the combined effects are causing changes in the environment.

In addition to changes brought about by natural forces, it has become apparent that the human being has become a powerful agent of environmental change. The world's population has almost doubled in the last thirty years. The earth's resources have become scarcer. Unless something is done to bring about a balance between human needs and available resources, the future is unclear.

Environmental Science is concerned with the study of the earth as a network of interconnected systems, and especially with the effects of human activity. Like other sciences, environmental science aims at producing increased knowledge and understanding of how our planet works.

Because every person has a stake in the future health of the planet, the state of the environment has universal appeal. Students often find environmental topics more concrete and approachable than traditional subjects. Many students involved in environmental studies begin to appreciate their disciplines, and see the role in their exploration. Thus, the environment is an
excellent vehicle for learning.

According to Ramsey, John M., Hungerford, Harold A., and Volk, Trudi L. *Environmental Education in the K-12 Curriculum: Finding a Niche,* (1992) “The task of recasting U.S. K-12 curricula in an environmental dimension poses not only significant challenges but also untapped potential, particularly with respect to opportunities for interdisciplinary configurations. The real task is not who, what, or how. It is when and where - the committed integration of effective and systematic EE approaches into existing K-12 curricular frameworks.” The educator must become a model for students in this area.

**Statement of the problem and subproblems**

The purpose of this project was to develop an Environmental Education Scope and Sequence Plan for the Waupaca School District K-8 teachers. Initially to gain acceptance of the project, the Director of Instruction was approached.

Environmentally concerned educators were selected for membership in a core committee which developed an EE Scope and Sequence Plan that Waupaca K-8 teachers can follow and which will create a comprehensive environmental education program. These teachers must be representative of each designated level (K-2, 3-5, 6-8). This committee worked together to identify instructional objectives at each grade level and within each area of study. Once the objectives are formulated, the level (K-3, 3-6, 6-8) at which they should be introduced, reinforced, developed further, and applied must be identified.

This information was put into a simple matrix that is easy for the teachers to follow. Upon completion of the Scope and Sequence Plan an
implementation procedure will be used to disseminate the materials as well as demonstrate how to infuse into the curriculum. This project only covered the scope and sequencing of environmental instructional objectives. It does not identify specific lesson plans, activities, resources or evaluation processes. This is only the formation of the plan. The effectiveness of the plan will not be determined as this project merely represents its implementation. Only time will prove its efficiency.

**Rationale**

Educational systems must keep up with the progress of government, business, household and individual decision making. The world as it exists now is being environmentally impacted by human lifestyles. EE is a task that presents a major challenge for all educational systems and their decision makers. The challenge is to define when and where EE can effectively be incorporated into an already existing curriculum of school districts. It is the role of educators to help students become environmentally dedicated citizens.

The Waupaca School District needs clearly stated goals to direct teachers when incorporating EE into their curriculum. A well defined Scope and Sequence Plan will provide the needed direction and will promote positive teacher attitudes toward infusion. Therefore, the chance of EE being successfully infused will be increased and the occurrence of curriculum duplication will be reduced.

The project will also pave the way for future EE projects in the district. The Scope and Sequence Plan is intended to be the foundation upon which activities can be built.


**Background**

On October 26, 1977, the Tbilisi Intergovernmental Conference of Environmental Education issued a declaration that was recognized throughout the world. It emphasized the importance of environmental education. Conference participants believed that society prepares its citizens to carry out their responsibilities through the educational system. Education must work to help each citizen develop an awareness of and a sensitivity to the environment and its problems. Furthermore, education must help each citizen acquire the knowledge and understanding needed to work toward the resolution of environmental problems. Therefore education must foster positive attitudes and patterns of conduct toward the environment (Engleson, 1985). To accomplish this task, those present at the conference constructed a set of environmental education goals. Those goals are known as the Tbilisi goals. Included in these goals are Awareness, Knowledge, Attitudes, Skills and Participation. (Appendix A)

Thirteen years later, spurred by the statewide educational reform package, the state of Wisconsin mandated into its curriculum plan Standard (k). This requires that "EE objectives and activities shall be integrated into the kindergarten through grade 12 sequential curriculum plans, with the greatest emphasis in art, health, science, and social studies education." (section 121.02 (1), Wis Stats. 1990) This mandate clarified that a need exists in the Waupaca School District to establish a framework within which Environmental Education can be taught. Waupaca teachers need direction as to when and where EE topics should be taught. The end result will encourage students to use their awareness and knowledge of the environment, to develop a positive attitude about the environment and finally act on their beliefs and values.
The Goals for Curriculum Development in Environmental Education (Hungerford, Peyton, Wilke, 1980) conclude that it is necessary to use a valid, syntactically sound suitable framework, when developing environmental education curriculum. For this to occur planners must adhere to the following basic guidelines when developing curriculum: (a) develop an EE philosophy as well as goals and objectives; (b) determine scope and sequence and relate these to integration of content area; (c) organize resources and staff preparation; (d) implement activities into a subject area curriculum; (e) assess and revise if necessary. (Lane, 1993)

Environmental decisions are made daily by consumers, producers, recreators, procreators and voters. The ability to make such decisions and choices in a manner that will sustain human society is dependent upon the degree of environmental literacy of each citizen. The degree achieved is largely a function of education and character development. The development and fostering of environmental literacy needs to be a key objective of any general education program. (Roth, 1992)

The above guidelines were used when establishing the Environmental Education Scope and Sequence Plan for the Waupaca School District in kindergarten through eighth grade. The philosophy and goals developed reflect the current thinking and experience of educators from Wisconsin, the nation and the world. They were designed under the assumption that all educators have a responsibility to teach students to become lifelong stewards of the earth.

The main components of a Scope and Sequence plan are the objectives. The abundance of environmental concepts requires that a systematic approach be used to assign instructional objectives to grade levels. To ensure that all
environmental concepts are covered, objectives should be categorized according to the environmental education goals established in the Tbilisi Declaration.

Knowledge and awareness goals were found to be most prevalent in existing Wisconsin EE curriculums to date. Objectives that develop problem solving skills and apply them to environmental problems had less emphasis. This lack is contrary to the recommendations for EE objectives contained in both the Belgrade Charter and the 1977 Tbilisi Intergovernmental Conference Report. This inconsistency according to Hungerford, Peyton and Wilke may be due to the difficulty in translating the general goals into manageable instructional objectives. They believe that ecological foundations need to be established that are more definitive than the general EE goals.

The Waupaca Scope and Sequence Plan committee followed this suggestion with the use of a topic list. The topic list (Appendix B) closely follows the recommended list of ecological foundations, knowledge of which is necessary to make ecologically sound decisions with respect to environmental issues.

Attitude goals must be taught in such a manner as to encompass the ideal values of American society - not just the personal values of a particular educator. Young, morally heterogeneous students should concentrate on the formation of values and the development of an ethical system. As learners develop an independent system of values and ethics, environmental education strategies can concentrate more on enhancing learner self awareness of values and applying these in a way that is most beneficial to society and the environment. It is of critical importance for students to foster a strong awareness of his or her values and to understand how these relate to those that are socially
and environmentally beneficial to society (Caduto, 1983).

The Tbilisi skill goals are directly related to the participation goals as they are the tools needed to carry out the ultimate goal of citizen action. Environmental models should be used to teach students to become autonomous investigators of environmental issues as well as to teach them the basics of citizen action strategies. By doing so it is hoped that the knowledge of action skills will encourage them to be not only environmentally aware and concerned, but also environmentally responsible and active (Hungerford, Litherland, Peyton, Ramsey and Volk, 1990).

Once the task of developing a curriculum for environmental education is complete, the process of initiating its use is pertinent. It is essential that the curriculum be put into the hands of educators for effective use. Proper dissemination is required in order to insure infusion of EE.

In compliance to the Wisconsin mandate that EE be integrated, the process of EE infusion was developed so that environmental issues could be taught in all subjects. According to Ramsey, Hungerford and Volk, “Environmental content and skills can often be integrated into existing courses without interfering with the content and skills desired by involved faculty members.” (Ramsey, 1991) Infusion can be carried out effectively if respect to the integrity of the scope and sequence guarantees that instruction will proceed logically across content areas.

Educators need to be inserviced in order to utilize EE techniques and strategies in their classroom. Research has shown a short intensive workshop is more effective than longer workshops. (Mayer and Fortner, 1987)

A follow-up to the utilization inservice program will motivate teachers into action as well as provide needed support in their attempts to begin the infusion
process. (Sanchez, 1990)

**Goals and Objectives**

At present, the only indication that EE is being taught anywhere in the Waupaca School District is the flagging in curricular areas. Flagging is a process used in writing curriculum to indicate where certain mandated items that are not taught as separate subjects, such as those for the gifted and talented or concerning computers, are being taught. The flags are mostly superficial as the targeted areas don’t actually involve EE, but concern nature studies. In response to this condition, the establishment of a K-8 EE Scope and Sequence Plan in the Waupaca School District was the major objective of this project. An established curriculum is necessary so that other environmental projects can be taught cohesively. Teachers in the district need direction as to what EE concepts should be taught and where to teach them.

Once the EE Scope and Sequence Plan was created by a core group of environmentally concerned educators, the next objective was its dissemination. The plan had to be disseminated to the teachers who would be directly impacted by it when infusing EE into their curriculums. To insure that all such teachers received a copy, the EE Scope and Sequences Plan was hand delivered.

The last objective was to inservice the teachers in the use of the EE Scope and Sequence Plan. Inservices were used to explain the matrix and how to infuse EE into existing curriculums. Examples of activities were shared.
Definition of Terms

EE is environmental education.

Scope and Sequence Plan assigns the responsibility for teaching specific portions of content to specific grade levels.

Matrix is a conceptual diagram representing the objectives on which each grade level should concentrate.

Infusion is the integration of EE content and skills into existing courses in a manner as to focus on that content (and/or skills) without jeopardizing the integrity of the courses themselves.

Assumptions

A need existed for an EE curriculum guide in Waupaca School District as there was nothing to direct teachers as to what, where and how infusion of EE could be implemented. It was believed that if an advisory council representing all grade levels were formed to develop an EE Scope and Sequence Plan, teachers would use it to infuse EE into their curriculums. The Scope and Sequence Plan would give direction to what teachers should teach about the environment. The sequencing would also avoid duplication of EE lessons.

CHAPTER II

METHODOLOGY

Project Promotion

The success of a new project or program depends upon approval by the
district. To gain approval, key people were contacted. The Director of Instruction was the initial person contacted in the promotion of a Waupaca School District EE Scope and Sequence Plan project. It was believed that this person would be an asset due to his curriculum knowledge. A prospectus of this project containing goals, objectives, research and a time-line was given to the Director of Instruction to review. Then the date for a meeting at which the validity of the project would be discussed was set. The meeting provided information on the proper steps for approval of the project. These were: First the document must be sent to the Director of Instruction to be typed. It was found to be simpler for select members of the core committee to take on the responsibility of typing. The reason for this was that the objectives were directly typed into a computer program as they were developed. Second, the document must be presented to the Instructional Committee of the school board for approval. It was suggested that this committee receive the document prior to the meeting to familiarize themselves with it. Presenting in steps would make the board part of the process as opposed to overwhelming them by presenting it all at once. Third, the document must be approved by the school board before it can be inserviced.

Another important official who must approve a new program is the District Superintendent as he can be persuasive in board approval. When interviewed he stated that the vertical and horizontal alignment of the Waupaca School District Curriculum is an area that needs improvement. (Appendix C) Often different objectives are taught at the same grade level or the same objectives are taught at separate grade levels. This is definitely a problem in the EE area so an EE Scope and Sequence Plan would be an improvement that is needed and that a project of this kind would be encouraged.
The Waupaca School District now leases or owns six outdoor educational facilities that are currently being improved to include interpretive trails and educational stations. Grant monies were received to enhance the properties for greater use by K-12 classroom teachers. With all this energy being focused on the environment, it made sense to create an EE curriculum. The objectives developed could then be used when incorporating these outdoor facilities into the curriculum.

The idea for a Scope and Sequence Plan for the district was accepted readily. There is a future concern as to whether or not teachers will actually follow the plan once it is completed. When asked who would be responsible for ensuring its supervision, the Director of Instruction replied, "As professionals each teacher is responsible to see that the members of their unit are teaching to the curriculum." The Superintendent suggested that eventually a test be devised as a tool for evaluating the effectiveness of the Scope and Sequence Plan. Then when a tested student missed concepts, it would be the responsibility of the principal to refer back to the teacher’s weekly lesson plans to see whether or not that objective was covered. Supervision to ensure that the identified curriculum is being taught still remains a controversial issue that needs resolution in order for the future of this project to be successful.

Core Committee

A teacher once said, if you want bureaucratic change to occur you should talk to the administration. If you want actual change you need to approach the teachers. Keeping this in mind, it was necessary to form a core committee of dedicated, environmentally concerned teachers to actively participate in and help decide what objectives should be covered in the EE Scope and Sequence
Plan. However, it must be noted here that if too many people make up a committee it can be counter-productive and slow down the progress because of personality conflicts. Therefore, teachers whose ideals are compatible with the project's intent as well as whose personalities don't conflict should be selected for the core committee to provide maximum productivity.

It was believed that the Director of Instruction would be an asset to and validate the core committee. It was important to include him because his presence hopefully would psychologically influence the attendance of members into continued participation.

One environmentally concerned educator was selected from the following levels to form the core committee: K-2, 3-5, 6-8, 9-12. This core committee would establish the philosophy, goal, and program objectives that would identify what students should know and be able to do with regard to their environment.

The dedication and knowledge of the core committee members was the key to success. It was prudent to approach teachers from each of these levels who already had environmental interest or convictions. This was easily accomplished in grades K-8. The most difficult task relating to this project was finding an interested representative from the 9-12 level because teachers from the high school seemed reluctant to commit. This problem eventually led to the elimination of grades 9-12 from the Scope and Sequence Plan.

The reasons for the elimination of these grade levels from the Scope and Sequence Plan were many. Other than the lack of interest, curriculum organization at the high school level also proved to be an obstacle. There was no set curriculum for any content area. This would have made it difficult to have a reference for where to infuse the environmental instructional objectives.
Graduation requirements are such that it would be impossible to reach every
student every year because they can elect to take certain classes and other
classes can be taken at different levels.

An Environmental Education class was already established at the high
school level. This course was viewed by the instructor and most of the High
School Faculty as the solution to the infusion of Environmental Education at this
level. The instructor also felt that many teachers do not have an adequate basic
knowledge of Science to be capable of infusing Environmental Education into
their classroom.

Four months were spent in attempting to develop possible solutions to
the problem of including the high school in this project. It was finally realized
that this inclusion could not occur in the time frame that had been set up for
completion of the project. A final copy of the K-8 Scope and Sequence Plan
was sent to the high school as a reference in hope that these grade levels
would eventually set up their own EE curriculum.

One other member of the core committee dropped out very early in the
year. Although reasons were never actually stated, speculation led to the belief
that this person, who had the role of health coordinator, was having difficulties
with infusing Health into the grade levels. She felt that similar problems would
be faced when trying to get the teachers to infuse EE.

The core committee (Appendix D) worked well as a group and for the
most part the members were consistent in their attendance. This was important
because the task of establishing the instructional objectives for grades K-8 is an
enormous one. In the early stages, it was thought that meeting once a month
would be sufficient. All too soon it was realized this would not be enough time.
The meetings were increased to every two weeks and then to once a week.
The three hour late starts and early dismissals that were built into the school calendar were also utilized for core committee meetings. Even with this schedule, it took one entire school year to complete the instructional objectives of the Scope and Sequence Plan.

The first meeting of the core committee was used to acquaint the members with the goals to be accomplished. An information packet was assembled containing samples of previously written material to assist the members. It included the Wisconsin Department of Public Instruction's *A Guide to Curriculum Planning in Environmental Education* (Engleson, 1985) philosophy statement, goals and objectives, grade level emphasis on EE objective categories (Tbilisi Subgoals) and samples from already existing scope and sequences from *CESA 5* (Portage 1987), *CESA 3* (Environmental Education Curriculum Development Task Force, 1987), and *Minnesota* (Minnesota Department of Education, 1991). Using this packet as a visual aid, the Tbilisi goals were explained. This method of assembling these type of packets was a strategy that was consistently used throughout the entire process of writing the Scope and Sequence Plan. It worked very well and gave necessary direction to each and every meeting. It was the key to keeping the meetings moving forward.

Folders for each member of the core committee were compiled. Some of the members came to the meetings from different school locations and had a tendency to forget their folders, so it was decided that the folders would be kept by the lead members at the meeting site. This also allowed the lead teachers to put assembled information packets directly into the folders in preparation of the next meeting.

The Director of Instruction for the district ordered a personal copy of the
Wisconsin Department of Public Instruction's *A Guide to Curriculum Planning in Environmental Education* (Engleson. 1985) for each of the core committee members. Also discussed was the matter of payment for the members in order to make the job more appealing. The options given by the school district's Director of Instruction were applying their time to count for the 7 1/2 hours of required inservice time or the other option was to keep track of hours worked and request $10.00 an hour which is the curriculum planning pay scale. The amount of paid hours could not exceed $100.00. Core committee members used both options.

**Philosophy, Goal/Mission Statement**

The personal philosophy adopted by the core committee was 'why reinvent the wheel?' Samples of existing curriculums and any information pertaining to EE were researched and collected for reference and applicable information was used.

The philosophy is a necessary component of a Scope and Sequence Plan. Handouts containing philosophy statement, goal and objectives from the *A Guide to Curriculum Planning in Environmental Education* (Engleson, 1985) were presented to the committee as guidelines. After surveying other sample philosophies from other school districts, it was decided to use the one from the *A Guide to Curriculum Planning in Environmental Education* (Engleson, 1985) making minor changes.

There was a lengthy discussion about the possible direction the goal/mission statement should take. The statement in the *Manitowoc Environmental Education Curriculum Guide* (Manitowoc Public School District, 1988) came the closest to the committee's thinking. This goal/mission statement was adopted with the understanding that it could be changed at a
later date if necessary. It was important to start making progress on the Scope and Sequence Plan.

District Goals


The goals in the Waupaca Scope and Sequence Plan were based upon the Categories of Environmental Education Objectives, Awareness, Knowledge, Values, Skills, and Participation that were established at the Tbilisi conference. Each member of the committee was given a packet of possible goals and assigned one of the Tbilisi goals. They then selected any goals that pertained to their assigned Tbilisi goal. A cut and paste method from these

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handouts was used to eliminate unnecessary writing. Each goal was cut out separately so that it could be taped onto the proper goal page. This allowed for future redistribution of the goals if it was decided by the committee that they would best fit into another goal area. This was a good procedure to use to accomplish the task quickly. These cut and taped sheets were reevaluated by the core committee and some goals were moved.

Overhead transparencies were constructed showing the list of goals picked from all the districts. These were used so the entire core committee could view the possibilities at the same time. From this list, district goals were decided. A total of eleven goals were selected. These eleven goals were divided among the Tbilisi subgoals in the following manner: Awareness-4, Knowledge-3, Attitudes-1, Skills-2, and Participation-1. The number of goals was decided upon by considering that keeping the Scope and Sequence Plan simple was important so that teachers using it would be able to understand it and not become intimidated.

Summary
1. A core committee of dedicated, environmentally concerned teachers was formed.
2. The EE philosophy was established by the core committee.
3. The concept of information packets was devised and these were consistently used to give direction to the core committee.
4. Scope and Sequence Plan goals were based upon the categories of EE objectives established at the Tbilisi conference.
Scope and Sequence

An EE program should be developmental in nature. It should integrate both content objectives as well as EE objectives. The Scope and Sequence Plan should provide a starting point for a successful EE program. It assigns the responsibility for teaching specific portions of content to specific grade levels.

Instructional objectives should be stated in performance terms. This permits the instructor to measure student performance during or subsequent to instruction. It is important that these be taken from preexisting curriculum used in content areas. Numerous existing school EE guides provided assistance in the identification of the instructional objectives.

Initially establishing a Scope and Sequence Plan can be overwhelming. Many schools have a consortium that outlines meetings and provides for outside evaluations. This provides a checks and balance system that helps committees know if they are keeping current with mandates and any other procedures. The Waupaca District has no specific curriculum evaluative tool which made the job of setting up a Scope and Sequence Plan even more of a challenge.

It was necessary to establish a concrete approach to the selection of the objectives for the Scope and Sequence Plan. Other schools had used what is referred to as the topic approach. It is helpful to include a list of specific environmental topics in the Scope. A sample handout (Appendix F) of the topic approach used by other schools was assembled. Included were topics from Wausau School District. Environmental Education Curriculum Guide K-12, (Wausau School District, 1991) Procedures for Developing an Environmental Education Curriculum, UNESCO-UNEP, (Hungerford, Peyton, 1986) and the Waupaca School District Science Curriculum. (Waupaca School District, 1991)
A final list of eleven environmental topics was composed. (Appendix A) These provided the backbone for the instructional objectives and the direction Waupaca would follow.

**Instructional objectives**

Each member of the core committee was assigned at least one Environmental Education curriculum guide that had been obtained from another school district. The intent was for each person to become well acquainted with at least one guide and refer to that guide in order to identify objectives that could be used for the sequence.

A separate group of instructional objectives was set up for each of the grade level sections, K-2, 3-5, and 6-8. This would eliminate the repetition of instructional objectives and direct teachers in the instruction of a large variety of objectives. The topic list was used as a reference point to ensure continuity of material and that relevant environmental material would be included in each of the grade sections. Teachers teach what they are exposed to and what information is readily available. This concept influences what they teach. (i.e. the oak savannas as opposed to the rain forest which would be more pertinent to our area) Ultimately teachers should be encouraged to use local and state information when exploring EE issues with the students. This will give the students hands-on experience in local issues making EE relevant.

It was decided that the general committee would determine whether to introduce, reinforce or master the instructional objectives within each grade level section. This would then make the transition from core committee to general committee easier because there would be a certain number of objectives for each of the levels which would be easier to manage.
The actual phrasing of an objective was an important consideration. The district's Director of Instruction was very insistent about using an action verb within each objective which would classify them as behavioral objectives. This would allow instructors to evaluate student learning behavior. The final objectives were written so that they were broad enough to give leeway to the teachers as far as interpretation is concerned, yet included the action verb so as to classify them as behavioral. Information about the formation of holistic objectives (Appendix G) was researched and used as a guide in the formation of the instructional objectives.

Formation of Instructional Objectives

Awareness

The awareness objectives were the first that were developed for the Scope and Sequence Plan. A concrete approach had not yet been formulated by the core committee when writing the instructional objectives. The core committee used other schools EE curriculums and utilize those objectives that fit the established goals and topic list. As the work of committee progressed and members became more familiar with the writing of the objectives, it was realized that these other scope and sequences were strong in the area of Awareness. This made it easy to use already formulated objectives that fit the philosophy adopted by the core committee. The primary goal of writing Awareness objectives for the K-2 grade level was to keep them simple because of the young age.

Knowledge

A packet was assembled containing the following research pertaining to
the Tbilisi goal of knowledge: Environmental Literacy: Its Roots, Evolution and Directions in the 1990's (Roth, 1993) Manitowoc Environmental Education Curriculum Guide (Manitowoc Public School District, 1988) and Curriculum Guide for Environmental Education. (CESA 5, 1987) Any research information relating to the category of Knowledge was cut and pasted to a sheet and photocopied so that core committee could use valuable meeting time to examine their copy of the available objectives rather than searching for them.(Appendix H) The knowledge strand from Environmental Literacy: Its Roots, Evolution and Directions in the 1990's (Roth, 1993) was instrumental in deciding what concepts would be appropriate for certain grade levels. Objectives from these guides were used or revised. The topic list was used as a constant reference to make sure objectives were included in all these content areas.

At this point in the formation of objectives, the idea of including examples to clarify an objective was discussed. This would provide teachers using the Scope and Sequence Plan a clear idea of the meaning of the instructional objective in case there was any confusion. There were times when a certain term would have different meanings even for the members of the core committee. It was necessary to stop and define the term. Examples were added to those objectives that could be interpreted in different ways.

The core committee had to remember to write objectives that that dealt only with environmental implications. The interpretation of the Tbilisi goal, Knowledge, reinforced this concept. Objectives were reviewed to make sure that those already being addressed in the school’s established science curriculum were not duplicated in the EE curriculum. The objectives were consistently cross-reference with the knowledge strand and the topic list as a
constant reminder to make sure all areas that were decided upon had been included.

It was found helpful to temporarily number the objectives that were written with a corresponding number from the topic list. This saved time when referring to the topic list and made sure that all topics were being covered. The Tbilisi subgoal definitions were reviewed frequently to help keep a focus on the type of objectives the core committee wanted to use.

Atitudes

Adolescence is an age when students need to realize the importance of individual actions and their consequences. It is also a time when the teaching of environmental education is most apt to make a difference. With peer pressure as strong as it is, interaction with peers can change an individual attitude to the attitude of the group. This can be effective if the correct attitudes are stressed.

Each member of the core committee received a packet containing the recent research on environmental education relating to the Tbilisi goal Attitudes. (Appendix I) The packet included: Tbilisi attitude goal, the attitude goal that the core committee had written specifically for the Scope and Sequence Plan, valuing skills from the research article, “A Curriculum Model for Environmental Values Education”, (Knapp, 1983) attitude objectives, the affective strands from Environmental Literacy: Its Roots, Evolution and Directions in the 1990’s, (Roth, 1993) Curriculum Guide for Environmental Education (CESA 5, 1987) and Outcome Scope and Sequence, (Minnesota Department of Education, 1991) EE attitude objectives. Again, the method of cutting and pasting and then photo copying the pertinent research applicable to the Tbilisi goal that was
being addressed seemed to work effectively.

The instructional objectives were continuously reviewed to make sure they contained action verbs which made them behavioral and could be evaluated. The attitude objectives should contain valuing key words that can be obtained from Krathwhol’s list. (Appendix G)

The core committee found the subgoal of attitudes to be debatable in nature. It is difficult to write objectives that have to do with values. All sides of an issue must be addressed to allow students to make their own value decisions. The instructor should not teach their personal opinions or biases. It is difficult to evaluate someone’s values as they are affective, not subjective.

At first the group’s consensus for writing these objectives was to keep them broad. Then it was decided that valuing skills that were directly related to EE should be used because the general values are already being taught. The committee members had difficulty developing a concrete approach to the category of Attitudes as this is a controversial area.

Knapp’s research was used to write the K-5 Attitude objectives. Some of the valuing skills from this article were too complicated or irrelevant so they were eliminated. Some were used verbatim and others were simplified. The objectives for K-2 were very broad because developing students at this age level often have the same values as their parents. The 3-5 objectives were also broad, but the committee decided to add some that were specific in order to make the transition to the 6-8 objectives because these were all very specific.

Skills

The skills research packet (Appendix J) contained objectives taken from Environmental Literacy: Its Roots, Evolution and Directions in the 1990’s (Roth,
1993). Environmental Education in the K-12 Curriculum: Finding a Niche (Hungerford, Ramsey and Volk, 1992), and Goals for Curriculum Development in Environmental Education (Hungerford, Peyton and Wilke, 1980). Each instructional objective need not taught independently from each other. The goal should be to incorporate the objectives and teach them as a unit.

The research in this area was found to be consistently the same. Each of the objectives were placed into a grade level that was age appropriate. This helped to form a base upon which the skill objectives were built. The committee found that more specific skills in the area of data collection and interpretation had to be added.

It may be difficult to use the topic list when writing skills objectives because getting that specific may be undesirable and not leave the teachers the freedom to choose the issues they feel comfortable with.

There was a common thread that appeared in all this research. The research suggested that skills that permit students to work effectively toward ends which are consistent with their values and take either individual or group action when appropriate should be covered in the K-2 objectives. These skills include persuasion, consumerism and ecomanagement. The 3-5 instructional objectives should include consumerism, political action, ecomanagement. In addition to reinforcing the previous objectives. In grades 6-8 basic legal actions should be introduced (i.e. EPA and OSHA regulations).

**Participation**

The participation packet (Appendix K) used the research Investigating and Evaluating Environmental Issues and Actions: Skill Development Modules (Hungerford, Litherland, Peyton and Volk, 1992). This led to the core
committee's discussion of whether or not a teacher could include a specific
citizen action in the curriculum when not all the students' values would fit that
particular action. The committee came to a consensus that it would not be
desirable to ask students to take citizen action on an issue unless they were
willing to do so. However, the Wisconsin Center for Environmental Education
recommended that teaching students specific action is necessary in forming
environmentally active citizens. This led to the revision of these instructional
objectives. They were phrased in a manner which encouraged a specific
citizen action yet allowed students to implement a solution compatible with their
values.

Summary

1. A concrete approach to the selection of the objectives for the Scope and
   Sequence Plan was established.
2. A list of specific environmental topics was composed which provided a
   backbone and general direction for the instructional objectives to follow.
3. Each member of the core committee was assigned at least one EE
   curriculum guide to become acquainted with.
4. Core committee members referred to their assigned guide for suitable
   objectives that could be used for the sequence.
5. A separate group of instructional objectives were set up for each of the grade
   level sections, K-2, 3-5, and 6-8.
6. A topic list was formulated and used as a reference to include relevant
   environmental material. It also served to ensure continuity of the Scope
   and Sequence Plan.
7. The instructional objectives were formed by using research relating to the
   Tbilisi subgoals.
Presenting to the Instructional Committee

The Scope and Sequence Plan must have board approval before the teachers in the district could be inserviced. The first step to obtaining Waupaca School Board approval in the Waupaca School district was to present the completed instructional objectives to the district's instructional committee to create awareness for this project. This committee consists of two school board members and the Director of Instruction. It was his duty to call the meeting. Material for this meeting was presented using the slide show format which can be found on the Macintosh Claris Works program. The actual slide show took 25 minutes. Included in this slide show format was the following information:

1. Cover sheet-graphics with title
2. Core committee member list
3. Research-Finding a Niche for EE in the K-12 curriculum
4. Tbilisi Conference information
5. Categories of EE Education objectives (goals)
6. EE mandate in WI
7. Infusion-definition
8. EE needs for Waupaca
9. Goal/Mission statement
10. Philosophy
11. Topics-from which objectives were written
12. Waupaca's proposed EE curriculum-existing components/future direction
13. Explanation of matrix and instructional objectives

Those in attendance at this meeting were two school board members, the
Director of Instruction, the District Superintendent and the two lead members of the core committee to explain the project. There was a question and answer period. The entire meeting took 45 minutes, resulting in positive feedback for the continuation of the project.

Sequence

The completion of the instructional objectives for grades K-8 was finally a reality. The next step was to take them and present them to the general committee for the sequencing. Three separate sections were organized to complete this task. Teacher in each grade level section, K-2, 3-5 and 6-8, would be responsible for sequencing their objectives.

As many teachers as possible were included in this process. By establishing their personal interest in the project, it was hoped that the teachers who had taken part in the sequencing would be more likely to use it.

Packets were made and distributed to all teaching staff two weeks prior to the sequencing meeting. These packets (Appendix L) included the cover letter explaining the purpose of the packet, a survey requiring teacher input to help with the development of the future Scope and Sequence Plan inservice, and most important, a list of instructional objectives for each grade level section.

The cover letter instructed teachers to read over all objectives for their appropriate grade level. They were to take notes on where they thought the objectives should be placed, add any other suggestions and circle unfamiliar terms to be used later for a glossary. They also were asked to fill out the survey for future in servicing. Poor results received from this packet led to the conclusion that the cover letter was not understood by the teachers or that they
were not interested. Possibly the format of a check-off sheet would be better than a letter.

The master packets were forwarded to the Director of Instruction who was to be responsible for distribution to K-5 teachers. The two lead core committee members handled the 6-8 grade level packets since they taught at this level. The Middle School was fortunate enough to have an aide to help with many of the copying and distribution tasks there. Teachers who were attending the inservice were to bring this input with them. Any teachers not able to attend were instructed to send their information along with a teacher who would be attending. Prior to the actual meeting, a recorder was designated from each grade. This appointment was accomplished by personally talking with the teacher, explaining that his/her role would be to designate, after group consensus, which instructional objectives were taught at each of the grade levels. This appointment was made in advance and it encouraged at least one representative from each grade to be present. In many cases this was the sole representation as most teachers did not send along their packets. Before the sequencing meeting we sent out a sheet to these facilitators listing five steps that we wanted them to follow. (Appendix M)

Sequencing K-8

The general committee meeting for sequencing the K-2 grade level was conducted during an inservice day. It was held from 7:30-9:15 A.M. One lead teacher from the core committee was responsible for facilitating the meeting. Representation was minimal, with no one representing the Kindergarten. Second grade was represented by one teacher who was already a member of the core committee. One first grade teacher attended. She had previously met
with a portion of other first grade teachers in her building. She compiled one
master copy from all which was extremely helpful. Time was available to place
each objective in its appropriate grade level and decide where it should be
introduced, reinforced or mastered. Then the appropriate subject area was
identified for each of the objectives. Even though attendance at this meeting
was low, this enabled the process to be completed within the short one and
three-quarter time frame.

The general committee of grade 3-5 teachers met at the same time, 7:30-
9:15 A.M., in another location. In attendance were three third grade teachers,
one fourth grade teacher and one fifth grade teacher. After a brief presentation
of the project goals, the teachers were asked to select those objectives that they
already addressed in their classrooms or ones that they felt would fit into their
curriculum subject areas. Again the the fourth and fifth grade teachers had
been asked ahead of time to attend. This is an important because it ensured
that there was at least one representative for their grades. Others who could not
attend were asked to return their packets or give feedback to a teacher who
was able to attend. This did not happen. As they worked within their group,
their cooperative efforts enabled them to complete the sequencing for their
level.

The middle school, grades 6-8, had the largest amount of representation
with thirteen teachers attending. They represented all subject areas in the
school. Two teachers from the Math department, three from the Social Studies
department, two English teachers, one Art teacher, one Tech Ed teacher, and
one teacher from Family Consumer and Education. Upon arriving at the
inservice, teachers were directed to a group according to subjects and told who
their recorder was. This recorder had also been assigned previous to the
meeting. Within these subject groups, teachers decided what objectives should be introduced, reinforced and mastered at what grade level. It was brought to the committee's attention that an objective could be mastered in one subject at a lower grade level and still be reinforced later on because EE is a lifelong learning experience.

Summary

1. The instructional objectives were presented to the general committee.
2. Teachers of each grade level section, K-2, 3-5, and 6-8 were responsible for sequencing the objectives.
3. All teaching staff received a packet two weeks prior to the meeting. It contained a cover letter, survey and instructional objectives.
4. Prior to the meeting, a recorder was assigned for each grade level to take down decisions that were made about the sequencing.
5. One lead teacher from the core committee facilitated each grade level meeting.
6. The project goals were briefly explained and then teachers were asked to select objectives that were already being addressed in their classroom.
7. Through cooperative group effort, the sequencing was decided within each grade level meeting.
8. Teachers who were unable to attend the meetings were asked to forward their completed packets to a teacher who would be attending the meeting.

MATRIX DEVELOPMENT

The matrix's visual construction is the first thing that is noticed by its users. When researching many existing EE curriculum now in use, it became obvious that it was important to keep the matrix as simple as possible to avoid
confusion and encourage greater usage. If the matrix is easily understood, it will more likely be used.

It was decided to pattern the matrix of the EE Scope and Sequence Plan for the Waupaca School District after that used by Manitowoc. They kept their matrix simple by incorporating all the necessary information to be taught about one objective on one page. Also each grade level was identified by using a different color paper, thus allowing for easy access to a particular grade level.

To expedite the process, it was decided that the matrix should be formatted using a computer program. A template was formed in which to enter the objectives. (See Figure 1).

<table>
<thead>
<tr>
<th>Knowledge - Objectives</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Modify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize that weather results in changes in our environment (i.e. volcanoes)</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Define the various factors that influence the relationships between populations and the environment</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Define succession and list examples stages of it</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Determine how plants and animals that are specialized to a specific environment can be threatened by environmental changes, natural or induced</td>
<td>S, S</td>
<td>S, S</td>
<td>S, S</td>
</tr>
<tr>
<td>Explore how pollutants affect the water cycle and world atmospheric conditions</td>
<td>S, S</td>
<td>S, S</td>
<td>S, S, H</td>
</tr>
</tbody>
</table>

*Legend: A=Art, B=Band C=Choirs, E=English, F=Family and Consumer Ed, H=Health, L=Language Arts, M=Math, P=Physical Education, S=Science, SS=Social Studies, TE=Technological Education*
Once the objectives were entered they would be ready for printing which would eliminate any extra steps before the final printing process.

On the top of each page in the Waupaca District EE Curriculum Scope and Sequence Plan the particular category of EE objective and grade level that is to be targeted was listed. Underneath it the EE goal related to that category of EE objective was listed. Below that the instructional objectives were listed that are to be taught targeting the designated EE goal. To the right of each instructional objective the level of mastery that should be attained upon teaching the objective was listed. Within these mastery the subject in which the objective should be taught was designated. Easy reference of the symbols used to represent the subjects was located at the bottom of each page. A different color of paper was used for each grade level for easy grade identification.

Each of the eleven EE goals was listed separately on a different sheet of paper. These EE goals were included in each of the grade levels to give consistency to the curriculum. Instructional objectives for each grade were placed below. Sometimes this may appear to be a waste of paper because in some grades there is only one objective for a particular goal. However, as this is meant to be a “living document” ample space was made available for notes to be written. This space can be used to list activities, resources, field trips, speakers and other subject areas that could be used to cover the objective.

The structure of the matrix was not thought-out carefully to avoid extra work. The future direction of the EE curriculum should have been considered at all times. By not allowing for the expansion of grades and subject areas, problems arose. In the Waupaca School District EE Scope and Sequence Plan, the four subject areas recommended by the state mandate Social Studies,
Science, Health and Art were used. After meeting with teachers to sequence the objectives, many teachers were present whose subject areas were not included in the matrix. Therefore changes were made to include everyone. These changes caused a major overhaul in the reformation of the computer template. Additionally, every single objectives had to be reentered.

**Board Approval**

After the completion of the sequencing of the Scope and Sequence Plan, the final project had to be presented to the instructional committee again. The Director of Instruction distributed a final copy to each of the members and the Superintendent to view prior to the meeting. The initiators of this project attended this instructional meeting to provide information and answer any questions. The following afternoon at the monthly board meeting, the completed Scope and Sequence Plan was approved for implementation. This approval was necessary before the inservice for the teachers could be conducted.

**Scope and Sequence Plan Dissemination**

In order to disseminate materials of curriculum content, the amount of copies was first determined. It was hoped that each teacher in the Waupaca School District would receive the entire copy for grades K-8 so that they would know what was being taught in all grade levels. Budget restrictions for paper did not allow for this. Next it was felt that it would be beneficial for each teacher to receive a copy pertaining to the grade level they teach as well as the grades before and after their own level. This too was not possible due to budget limitations. Finally, it was decided that each teacher would receive material
relating only to their own grade level. Any teacher interested in knowing what is
being taught in other areas can access that information from the professional
library located within the Instructional Media Center of their respective school
buildings. Those teachers who teach a number of subjects and grade levels
are given material representing all the appropriate grade levels. Teachers in
these areas included Gifted and Talented course teachers, Physical Education
teachers, Band instructors, Choir/Music instructors, and Art instructors,
Computer teachers, Behavior Disabilities teacher, Learning Disabilities
teachers, Technology Education teachers, and Family Consumer Skills
teachers. Others who received complete copies included District
Superintendent, School Board Members, Director of Instruction, and the
Elementary and Middle School Principals. Two copies were placed in each
library in the school district as well as in the Waupaca Public Library.

Each grade was printed upon a different color of paper for easy
identification. To accomplish this, each grade had to be designated a different
color that would not be close in color to the grade before or after it. Special
colors had to be ordered as the district does not carry nine different colors. The
ordering had to be done through the Director of Instruction as the paper was to
come from his budget. Covers and cover labels also had to be attained from the
same budget. Labels for the covers were printed up by the secretary to the
Director of Instruction.

The EE Scope and Sequence Plan was copied, punched and
assembled for distribution. This process was completed by a Middle School
aide and a core committee member.
Inservce

The dissemination of the EE Scope and Sequence Plan occurred at an inservice scheduled during a designated inservice time which was built-into the school calendar. The purpose of this inservice was to disseminate the completed Scope and Sequence Plan, explain the matrix, answer questions, and supply sample activities which would cover several of the objectives found within the document. (Appendix N)

Due to the lack of attendance at the general committee meetings, it was decided that the inservices would be more beneficial if they were combined into two sessions. The first session involved elementary (K-5) teachers and the second concerned middle school (6-8) teachers. Each session was one and one half hours long. Research showed that shorter inservices are better attended. The teachers present were given copies of the Scope and Sequence Plan for their grade level only.

The elementary inservice session was conducted by two volunteers from the core committee who teach at this level. They used a group activity to explain the five categories of environmental education objectives. These are Awareness, Knowledge, Attitudes, Skills, and Participation. The participants were divided into groups. Each group was assigned one of the five categories and told to report back to all of the participants activities that they were already using or could use to teach these objectives. The purpose of this activity was to reinforce these objectives as they are the foundation for the EE Scope and Sequence Plan. It also demonstrated how easily these objectives can be infused into the existing curriculum.

A Plan-It-Poetry lesson from Plan It Earth Unit in Ecology (Appendix O) was used as an existing activity to demonstrate the following awareness
objectives that would be taught in grades third through fifth: 1) Recognize the difference between renewable and non-renewable resources. 2) Become aware of the relationship between various components of the earth’s ecosystems. The knowledge objectives demonstrated were: 1) Students will develop an understanding of human impact and responsibilities relative to the environment; 2) Recognize how dependent humans are on any one natural resource; 3) Identify practices of energy conservation at home, in school or elsewhere; 4) List the various methods used to conserve natural resources.

The poem from Plan-It-Poetry was put up in the front of the room for everyone to read. Each group was then asked to rewrite certain stanzas from the poem which would show environmental awareness. This activity covered several of the behavioral objectives designated to be taught. This was an enjoyable activity and could be used at any grade level. Time was allocated to browse through selected environmental books and activities available in the school district.

The last twenty minutes were used to take the teachers on a short tour of one of the outdoor teaching facilities to encourage the incorporation of the trails with their behavioral objectives.

At the middle school inservice, teachers were given a copy of the EE Scope and Sequence Plan. A short presentation highlighted parts of the Scope and Sequence Plan and its intended use.

The group moved on to the computer lab where the computer game “Decisions/Decisions” was demonstrated by another core committee member, the computer teacher. This program could be used at many grade levels but the intent of the Scope and Sequence Plan is for the students to experience different activities and avoid repetition, therefore it was designated to be taught
at the sixth grade level in Social Studies. This program could be used to fulfill the majority of the attitudes and skills targeted at this level. Originally it was intended to have several different activities geared to specific grade levels but due to the small amount of teacher turnout, all the participants attended this session.

Next, a variety of materials and activities were displayed enabling teachers to browse through them for ideas. They were encouraged to make copies of the units they found useful. Again, the last twenty minutes were devoted to a tour of one of the outdoor teaching facilities with the hope that they would incorporate this area into their curriculum.

As indicated earlier, the number of teachers attending these inservice sessions was minimal. Concern for these low numbers initiated a plea to the elementary and middle school principals to call a faculty meeting. The principals agreed under the conditions that the meeting would be accomplished within the time frame of the contractual designated school day. The meetings were made mandatory which enabled the committee to explain the EE Scope and Sequence Plan, usage, some representative activities and procedures for infusion to the staff. This was necessary because all teachers must integrate this information into their curriculums.

It is common practice that after school meetings should last one half hour. To maximize the productivity of the designated meeting time, it was decided that hand delivery of the Scope and Sequence Plan to the teachers one week prior to the meeting would be most efficient. The purpose of this decision was twofold. First, it ensured that each teacher did in fact receive a copy. Secondly, it allowed time for teachers to review the material covered so they could ask pertinent questions or make informed comments at the meeting. It is not certain
if this was beneficial, as no questions were received from the staff during the presentation. However, the majority of the teachers were receptive to the efforts.

Two core committee teachers were asked to do a presentation for their own schools. Their principal thought it would be better to have their own peers present the Scope and Sequence Plan because they would be recognized by teachers in their own grade level as opposed to teachers from a different grade level.

Summary

1. The number of copies of the Scope and Sequence Plan needed for the district was determined.
2. The materials to print these documents had to be budgeted through the Director of Instruction.
3. The pages were copied and assembled into the completed document.
4. Dissemination of the Scope and Sequence would be accomplished through an inservice.
5. The document was presented to the teachers attending the inservice.
6. The Tbilisi goals were explained and the teachers were instructed on how to use the document. An activity was conducted which helped to reinforce the meaning of the five Tbilisi goals.
7. One objective was picked from the Scope and Sequence Plan and an activity was taught which showed the teachers how an objective could easily be infused into their curriculum.
8. A variety of materials and activities were displayed and time was given to allow the teachers to look at EE materials.
9. The last part of the inservice was a tour of the outdoor facility and examples were given on how teachers could use such facilities for the teaching of their objectives.

10. Building Principals called a short after school meeting to allow the core committee to inservice the teachers who did not attend the scheduled inservice.

Timeline

Year 1

Summer preceding initial beginning of the school year-gain acceptance of project by Director of Instruction.

September through November-set up core committee and develop EE philosophy, goal and objectives.

December through May-compose the instructional objectives grades K-8.

Year 2

September to present completed instructional objectives to district's instructional committee for initial review.

October-set up general committee and decide sequence.

November through January-enter all information into computer matrix.

January-present to instructional committee for approval. Present to school board for approval.

February-dissemination of scope and sequence plan. Inservice to teachers
CHAPTER III

Results

The result of the project is the completed Environmental Education Scope and Sequence Plan for the Waupaca School District: Kindergarten through Eighth Grade. (Appendix P)

CHAPTER IV

Conclusions

The major goal of this project was to create a Scope and Sequence Plan to be utilized by grade K-8 teachers in the Waupaca School District. The plan was constructed in a manner which will enable the teachers to infuse EE into already existing curriculums. Activities to encompass the instructional objectives were not included in this project. It is hoped that teachers will be recording activities that they use and these will be added when the EE curriculum comes up for review.

A major problem with writing the plan was the lack of adequate existing curriculum in the district which is developmental in nature. Presently teachers in each grade are responsible for the writing of their curriculum. The result is curriculum that lacks continuity through the grades. This sequence plan is the first curriculum to be developmental in nature. This was viewed positively by the district, select board members and various teachers involved.
The instructional objectives were formed by a core committee. This committee was the key to the success of the project. These objectives were then presented to a general committee composed of a group of teachers from various grade levels. It was difficult to get an adequate representation from many of the grades to complete this process. The core committee concluded that this was due to the fact that Environmental Education is not viewed as a high priority by many of the teachers in the district. The inservice sessions used to present this material also were used for many other activities which seemed to have greater priority for most of the teachers in the district. Finally, attending any of the sessions organized to present information about the Scope and Sequence Plan was not made a mandatory requirement by the Director of Instruction. If it had been, it would have made the job of sequencing much easier and would have established the "ownership" aspect which was anticipated so as to ensure the use of the Scope and Sequence Plan.

The inservicing of the project was essential to explain the matrix and how teachers would infuse the instructional objectives into the existing curriculum. Again, attendance for these sessions was minimal which posed some difficulties. Any remaining decisions about sequencing was left to the core committee. An additional inservice had to be conducted in order to disseminate the Scope and Sequence Plan to teachers who had not attended the first inservice. Fortunately the building principals supported this inservice and did make it a mandatory meeting which was conducted at a short meeting after school. Although time was limited, at least all remaining teachers obtained their personal copies of the plan and received basics ideas of how to use it.

As in so many other aspects of education, there are the concerned teachers who are willing to try new ideas. It was these people who expressed
positive feedback about the project. There are always the teachers who fear change and are satisfied to continue along the path of the least resistance. Until a solution to this problem is devised, the success of the project will be unclear.

Project Recommendations

1. The key people selected to formulate a core committee must have a strong interest and believe in the program to remain involved. It is important to select members that have a strong knowledge base and whose personalities would not conflict. This is important in order to keep the meetings moving forward. All members must be kept on task to utilize the allotted time productively.

2. Research used to back up ideas is a very effective way to get people to believe in a project. When ever possible research packets should be assembled to provide a source of ideas and keep the committee current.

3. Adequate time must be given to consideration of the appropriate matrix selected for use. Make sure that it is not a dinosaur before beginning, as revisions can be extremely time consuming. The future direction of the curriculum must be considered at all times. Expansion of grades and subject areas must be allowed for.

4. Teachers have busy schedules. In order to receive feedback, surveys or necessary information should be presented in a simple a format in check list order. By making it as effortless as possible teachers are more apt to return the data.
Waupaca School District Recommendations

1. To obtain full benefit of the EE Scope and Sequence Plan, the establishment of an EE resource center at each school needs to be budgeted for. Additional funds must be available for updating the resources.

2. The district must support teachers to continue the work on the EE curriculum. This support could be accomplished by offering curriculum writing pay or compensatory time.

3. Activities should be identified or created that will encompass the instructional objectives set forth in the EE Scope and Sequence Plan.

4. A list of user-friendly resources should be compiled that would include school, community, state and national resources, as well as environmentally conscious agencies supporting EE.

5. Evaluation procedures should be devised that will test student knowledge of EE material presented in the Scope and Sequence Plan. It would be best to target these at grade levels that are not currently being tested in other areas.

6. Inservicing teachers for infusion of EE into curriculums would greatly increase the frequency with which EE is currently being taught. Successful inservicing needs to take into consideration the grade level, classroom environments and constraints of the teachers. Educators who teach elementary-age children have different needs than do those who teach older children. Effective inservicing should provide teachers with activities that are related to their curriculum content.

7. A checks and balance system should be established to encourage teacher follow through when the implementation of the EE Scope and Sequence Plan occurs. A person must be designated to ensure that teachers
are following the curriculum.

8. Communication is the key for a school program to be successful. It must extend within the institution as well as into the community. The more people are aware of what is going on the greater will be the recognition and support of the program.

To be able to make this list possible the Waupaca School District must continue development of environmental curriculum for the Scope and Sequence Plan. Core committee members need to encourage the staff and administration to place environmental education as a priority.
Literature Cited


Minnesota Department of Education. Outcome Scope and Sequence. Little Canada, MN: Minnesota Curriculum Services Center, 1991.


Waukesha School District. Environmental Education Scope and Sequence Matrix.


CATEGORIES OF ENVIRONMENTAL EDUCATION OBJECTIVES

Awareness: Helping students acquire an awareness and sensitivity to the total environment and its problems; develop the ability to perceive and discriminate among stimuli; process, refine, and extend these perceptions; and use this new ability in a variety of contexts.

Knowledge: Helping students acquire a basic understanding of how the environment functions, how people interact with the environment, and how issues and problems dealing with the environment arise and how they can be resolved.

Attitudes: Helping students acquire a set of values and feelings of concern for the environment and the motivation and commitment to participate in environmental maintenance and improvement.

Skills: Helping students acquire the skills needed to identify, investigate and contribute to the resolution of environmental issues and problems.

Participation: Helping students acquire experience in using their acquired knowledge and skills in taking thoughtful, positive action toward the resolution of environmental issues and problems.
Topics

1. Environmental Habitats
   a. biomes
   b. communities

2. Appreciation/awareness

3. Consumerism

4. Water

5. Land

6. Air

7. Energy

8. Wildlife/Fauna

9. Plantlife/Flora

10. Populations
    a. human
    b. animal
    c. plant

11. Management
    a. Protection
    b. preserve
APPENDIX C

David Poeschel-Waupaca School District Superintendent

1. What do you see as the district’s priority? Vision 2020—which is a school district plan devised stating goals and objectives in seven strand areas. Those areas include governance/management of schools, staff development, facilities, community relations, academic achievement/instruction, technology and legislation. Action teams will then work in each area to find ways for implementation. This plan will provide opportunity for board, administrative, support and professional staff development.

2. What do you see as curriculum priorities? 1. Vertical alignment—a continuation from grade to grade. 2. Horizontal alignment—the same thing is being taught in the same grade. 3. Student evaluation process.

3. How does curriculum get checked to see if it is really being taught? Ideally this is what I would like to see happen: Every teacher should have a copy of the curriculum and use it as a “living document” that changes daily and is constantly being updated. When lesson plans are turned in to the principals they should be cross referenced with the curriculum section. That way when a student is tested and missed areas, it can be seen whether or not that area in the curriculum was missed.

4. What kind of support can we receive once our scope and sequence is done? That is very hard to regulate what you might want to do is to show accountability by picking 3 grade levels and build in an exam to see if the knowledge is being taught. Stay away from grades 3, 8, 10 as those grades are used now for competency based tests. Another way to see if they are teaching EE is to have the teachers update the scope and sequence to see what worked and what didn’t. An EE Fair, similar to the Science Fair, might be a way to peak interest in other teachers and students. Have teachers with vast amounts of knowledge in this area like Bob Welch, share his information with other teachers in the district. There would be no problem for them to find a substitute while they are working in other classes.
5. What type of funding would be available for us in the area of curriculum development? **Make an application for curriculum development through the director of instruction for curriculum development monies.** Use early release time designated for inservice time to work with other teachers. There is a staff development grant available for inservicing that may be useful to you.
A special thanks to the following teachers who dedicated considerable time to the writing of this project.

CORE COMMITTEE MEMBERS
Dorethy DeWild
Julie Eiden
Kathy Forseth
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Other contributors include:

Teachers who attended the in-service to help decide the sequence

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Bret Carey  Joan Schultz  Bonnie Schimberg  Steve Frey
Nancy Pulvermacher

Lynn Konopacky-for her help in duplicating and assembling the plans
DEPARTMENT GOALS

Awareness:

1. To develop an awareness that people are an integral part of the earth's environment.
2. To develop the students' understanding of the role populations play in the earth's environmental problems.

Knowledge:

3. To develop students' knowledge of ecological principles as they relate to environmental issues and their consequences.
4. To develop the concept that all natural resources are limited and should be managed wisely.

Attitudes:

5. To develop student values that result in motivation and commitment which lead toward maintaining and/or improving the environment.
6. To develop student attitudes that environmental issues have no physical boundaries.

Skills:

7. To develop students' use of a scientific thinking process with respect to the environment, thus enabling the students to apply, analyze, synthesize and evaluate information.

Participation:

8. To develop students' responsible actions within the school district that will promote environmental conservation.
9. To encourage students to participate in maintaining and/or improving the environment.
MISSION STATEMENT

Recognizing the interrelatedness and interdependency of all things on our planet, the goal of environmental education is to help students become knowledgeable, skilled, dedicated citizens who are willing to work toward achieving and maintaining a dynamic equilibrium between the quality of life and the quality of the environment.

PROGRAM GOALS

1. To help students develop an awareness and sensitivity to the total environment and its problems.

2. To help students gain a basic understanding of how the environment functions.

3. To help students learn to properly interact with the environment.

4. To help students identify issues and problems dealing with the environment and how they can be resolved.

5. To help students acquire a set of values and feelings of concern for the environment.

6. To encourage students to participate in environmental maintenance improvement.

7. To help students obtain the background needed to identify, investigate, and contribute to the resolution of environmental issues and problems.

8. To help students acquire experience in using their knowledge and skills in taking thoughtful, positive action toward the resolution of environmental issues and problems.
INTERDEPENDENCE

The world has become more crowded, more interconnected, more volatile. What happens in the farthest corner of the world now touches us quickly. The world is facing, within the next century, a series of critical global deadlines: the possible elimination of minerals and resources on which most of us have come to rely; the total extinction of societies of people; the threat of ecological imbalance due to the extinction of planet and animal life. Our technologies are enormously successful at producing economic goods and services, but increasingly technological developments have proved to be disastrously incompatible with natural environmental systems. The survival of all living things, the quality of life, and the continued success of all human activities depend on the integrity of the complex web of biological processes that comprise our environment. Our students need to understand that web...perhaps as Rene Dubos (A God Within) sees it:

"The sensuous qualities of earth’s blue atmosphere and green mantle are not inherent in its physical nature; they are creations of countless microbes, plants, and animals that it has nurtured and that have transformed its drab inanimate matter into colorful living substance. Man can exist, function, enjoy the universe, and dream dreams only because the various forms of life have created and continue to maintain the very special environmental conditions that set the earth apart from other planets and generate its fitness for life - for life in general and for human life in particular."

Our students also need to redefine their place within that web rather than as overlord of it. In Wilderness and Plenty, F. Fraser Darling states:

"The exclusion of man from the hierarchy of nature, so common in the past and even in our own time, is to put him in the position of bourgeois rentier, living off an economy but having no responsibility for it. To make him an integrated functional member of the planet and animal world about us is no denigration of this high estate, no assumption of a mealy-mouthed egalitarian folksiness. Rather does man accept his position in nature as the species granted him the privilege of fulfilling the aristocratic ideal of noblesse oblige, of being the servant of his people."

Human and planetary survival rests in each of our hands. Interdependence is the word most frequently used to describe the interrelated nature of people, issues and events in today’s world. It demands that our perspective be global. The school shares in the responsibility of initiating consciousness of these critical conditions as well as correspondent action which will save the planet.

The Wisconsin Rapids Public Schools' Environmental Education Committee hopes that by utilizing Camp Alexander we will expand classroom learning through meaningful application of knowledge to practical out-of-door situations. Through these experiences the student will:

1. Develop a deep appreciation for the diverse outdoor environment.

2. Develop an awareness of the diversity and importance of our out-of-door resources and their concomitant values as they relate to the environmental, economic, and sociological health of the region, the country, and the planet.
3. Develop an understanding of the impact of, and role played by, the out-of-doors environment in shaping the political, economic, and social events and behaviors of the past, present, and future.

4. Become acquainted with the perspectives from and by which various interest groups judge contemporary environmental issues, the mechanisms by which these issues are resolved, and ways in which their outcome may be influenced.

5. Gain sufficient knowledge and skills that they may intelligently predict and evaluate the impact of a specific management policy on the out-of-doors environment and its interdependent communities.

6. Develop a basic understanding of how the life-support system of planet earth functions and have the necessary skills and knowledge to evaluate the short-term, and more importantly the long-range effects that manipulations of segments of this system will have on its integrity.

7. Gain skills and knowledge to evaluate and modify their own lifestyles in light of an acute awareness of the finiteness of planet earth.

8. Realize the importance of energy relationships among all living things, especially in terms of his/her own survival.

9. Value other forms of life on which he/she directly depends for energy.

10. Be able to describe feelings in response to paintings or photographs depicting the out-of-doors, and will also be able to describe their thoughts about the importance of the out-of-doors to artist's expression.

11. Develop an understanding of the natural-cultural environmental relationship and the human responses to these environments.

12. Develop an understanding of the aesthetic components of the environment.

13. Be able to differentiate between aesthetically satisfying and dissatisfying environmental qualities.

14. Become acquainted with the relationship between leisure time activity and the impact on the environment.

15. Learn different strategies of seeing in order to increase awareness of familiar and unfamiliar surroundings and the relationships of natural and man-made things.

16. Learn that ethical decisions and actions regarding the environment must be based on relevant information as well as awareness of immediate and long-range consequences.

17. Become acquainted with the influence of the environment on the creations and artifacts of primitive cultures.

18. Be able to differentiate between the phrases: quality sensitive and quantity oriented.
K-Living things have the following basic needs; adequate nourishment, adequate space, and suitable climate.

1-Green plants are essential for life.

2-A suitable environment is necessary for the growth and reproduction of living things.

2-Environment determines the kinds of plants and animals which make up a community.

2-Living things adapt, find a new habitat, or are eliminated as the environment changes.

3- Living things obtain nourishment from the environment; eliminate waste to the environment and reproduce.

3-Green plants are essential for life.

3-A living thing is a product of its hereditary and its environment.

3-Living things are interdependent with one another and their environments.

4&5-Living things are interdependent with one another and their environment.

4&5-Species and environmental factors interact to keep plant and animal populations in balance.

4&5-there is a gradual and continuous replacement of one kind of plant or animal community by another.

4&5-existence of humans have been and will continue to be a factor affecting plant and animal succession and environmental processes.

4&5-All natural resources are vulnerable to depletion of quantity and quality and must be managed to insure their continued availability.

4&5-The protection of the environment depends on the exercise of an ethic accountability for human impact on ecosystems.
Grades: Sixth, Seventh, and Eighth

Major Emphasis

6th - Understanding the Interdependence of Natural Resources/Management of Natural Resources

7-8th - Management of Natural Resources/Environmental Issues

Concepts: The student should know that:

Ecological Concepts:

1. Living things adapt by structure and function to their environment.
2. Each species has an unique role to play in the ecosystem.
3. Living things are interdependent with one another and their environment.
4. Species and environmental factors interact to keep plant and animal populations in balance.
5. There is a gradual and continuous replacement of one kind of plant or animal community by another.
6. The rate of change in an environment may exceed the rate of organism adaptation.
7. The more specialized an organism becomes, the less it can adapt and survive environmental changes.
8. As an environment changes, organisms adapt or are eliminated.

Management & Issues Concepts:

9. The existence of humans has been and will continue to be a factor affecting plant and animal succession and environmental processes.
10. Increasing human populations, rising levels of consumption, developing technology, and the resulting demands for greater industrial and agricultural productivity promote increasing environmental use and impact.
11. Humans are influenced by many of the same hereditary and environmental factors that affect other populations or organisms.
12. The protection of the environment depends on the exercise of an ethic of accountability for human impact on ecosystems.
13. There are aesthetic, economic and ethical considerations involved in environmental decisions.
14. Environmental management by individuals, communities, and organizations presents both problems and solutions for ecosystem maintenance.
15. Environmental policies and laws are generally enacted as a result of pressure from concerned groups and individuals.
16. A variety of institutional structures (legal, governmental, educational, private and corporate, etc.) are involved in planning and managing the environment.
17. All natural resources are vulnerable to depletion in quantity and quality and must be managed to ensure their continued availability.
18. Natural resources must be widely managed to meet the needs of successive generations.
19. Resource depletion can be slowed by the development and adoption of alternatives.
20. A land area may have multiple uses which are compatible with ecological and human needs.
21. Conflicts emerge between private and public land use and the maintenance of environmental quality.
22. Individuals often tend to select short term economic gains, at the expense of greater long term environmental benefits.
23. Natural resources are unequally distributed with respect to land areas and political boundaries.
24. Goods and services are produced by the interaction of labor, capital, natural resources and technology.
25. Recycling is essential to resource management.
26. Pollutants and contaminants are produced by natural and man-made processes.
27. Management and appreciation of natural resources requires recognition and identification of their characteristics, uses, and functions.

Curriculum Suggestions:

A variety of units should be developed at the middle school level which would address the following topics:

1. Recycling
2. Pollution (point and nonpoint)
3. Legislation
4. Land use and urban sprawl
5. Lifestyle
6. Managing natural resources (wildlife, air, water, soil, minerals, and biological organisms)
7. Department of Natural Resources
8. Population
9. Energy use and conservation
10. Agriculture
11. Natural habitats and their preservation
12. Transportation
13. Recreation
14. Political activism
15. Role models of noted conservationists or environmentalists
16. Establish mentor programs with retired D.N.R. personnel or other resource experts.

Grades: Nine, Ten, Eleven, Twelve

Major Emphasis: Management of Natural Resources and Environmental Issues

Instructors of Science, Social Studies and Agriculture should review the middle school list of environmental concepts and include those which are appropriate for their curriculum.

We have developed a model that should enable both teachers and students to more clearly understand the decision-making process and how it relates to the environment. The title of this model is "Diagnostic Model for Individual Decisions and Their Environmental Consequences."

We have also developed a second model that helps in our understanding of how environmental problems affect all components of our human ecosystem and must be studied from each of these critical areas. The title of this model is the "Interactive Model of the Human Ecosystem and the Individual." It also helps clarify the role of the individual in interacting with all components of their culture and how each influences the environment.
MINNESOTA

Learners should understand ecological systems.

Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

Learners should understand the cause and effect relationship between human behavior and attitudes in the environment.

Learners should analyze, develop, and use problem solving skills to understand the decision making processes of individuals, institutions, and nations.

Learners should evaluate alternative responses to environmental concerns or issues before deciding on a course of action or no action.

BOSCOBEL

Knowledge
Acquire information about natural environment

Acquire information about interactions between living (biotic) and non-living (abiotic) substance of the natural environment.

Acquire the concept of energy and its transformation in physical systems.

Acquire information about interactions between humans and the environment.

Attitudes and Values
Acquire positive beliefs, attitudes and values regarding the environment, and to develop and ethic on which they may act to defend, improve, and sustain the quality of the environment.

Citizen Action Skills
Develop the skills needed to identify, investigate, and to take action toward the resolution of environmental issues.

Citizen Action Experience
Gain experience on applying acquired environmental awareness, knowledge, and citizen action skills in working toward the resolution of environmental issues at all levels local through universal.
TERMINAL/EXIT OBJECTIVES

Awareness

A. The students will develop the ability to perceive and discriminate among stimuli.
B. The students will process, define, and extend their perceptions.
C. The students will use their perceptual/discrimination abilities in a variety of contexts.

Knowledge

D. The students will develop an understanding of the interrelatedness of the Earth's systems.
E. The students will develop an understanding of how the environment affects humans.
F. The students will develop an understanding of the impact of humans on Earth.
G. The students will develop an understanding of human responsibilities relative to the environment.

Attitudes

H. The students will develop the understanding that the self is important.
I. The students will develop the understanding that others are important.
J. The students will develop the understanding that the environment is important.

Skills and Participation

K. The students will develop basic skills that are essential to the resolution of environmental issues and problems.
L. The students will develop integrated skills that can be applied in hypothetical situations and case studies.
M. The students will apply these problem-solving/decision-making skills in real-life situations.
Level II. Conceptual Awareness Level—Issues and Values

This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.

Goals at this level are formulated to provide opportunities for receivers to conceptualize:

A. how man's cultural activities (e.g., religious, economic, political, social, etc.) influence the environment from an ecological perspective.
B. how individual behaviors impact on the environment from an ecological perspective.
C. a wide variety of environmental issues and the ecological and cultural implications of these issues.
D. the viable alternative solutions available for remediating discrete environmental issues and the ecological and cultural implications of these alternative solutions.
E. the need for environmental issue investigation and evaluation as a prerequisite to sound decision making.
F. the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making.
G. the need for responsible citizenship action (e.g., persuasion, consumerism, legal action, political action, ecomanagement) in the remediation of environmental issues.
H. make decisions concerning environmental action and environmental issues which must be resolved with respect to particular environmental issues.
I. That the goals for curriculum development in EE are appropriate for use in guiding both formal and nonformal EE curriculum development efforts.
J. That a "receiver" can be thought of as any person of any age, who can be reached through either the formal or nonformal educational sectors.

Level III. Investigation and Evaluation Level

This level provides for the development of the knowledge and skills necessary to permit receivers to investigate environmental issues and evaluate alternative solutions for remediating these issues. Similarly, values are clarified with respect to these issues and alternative solutions. Goals at this level are presented in two components.

Component A: Goals for Component A are to develop in receivers:

A. the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information) and to synthesize the data gathered.
B. the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
C. the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions.
D. the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.
E. the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions.
F. the ability to evaluate, clarify, and change their value positions in light of new information.

Component B: Goals for Component B are to provide receivers with opportunities to:

G. participate in environmental issue investigation; evaluation.
H. participate in the valuing process in a manner as to permit the receiver to evaluate the extent to which the values are consistent with the superordinate goal of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level IV. Environmental Action Skills Level—Application

This level seeks to guide the development of those skills necessary for receivers to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment. Goals at this level are presented in two components.

Component A: The goal for Component A is to develop in receivers:

A. those skills which will permit them to effectively work toward ends which are consistent with their values and take either individual or group action when appropriate, i.e., persuasion, consumerism, political action, legal action, or ecomanagement.

Component B: The goals for Component B are to provide receivers with opportunities to:

B. make decisions concerning environmental action strategies to be used with respect to particular environmental issues.
C. apply environmental action skills to specific issues, i.e., to take citizen action on one or more issues.
D. evaluate the actions taken with respect to their influence on achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment.

Assumptions Made By the Developers

The following assumptions have been made relative the goals:

1. That the goals for curriculum development in EE are appropriate for use in guiding both formal and nonformal EE curriculum development efforts.
2. That a "receiver" can be thought of as any person of any age, who can be reached through either the formal or nonformal educational sectors.

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It is generally agreed by curriculum specialists that, irrespective of the subject, goals are needed to provide a sense of direction for curriculum development and instruction (9). Vande Visse and Stapp have expressed the need for goals in environmental education (13). They have warned that "... without a clear statement of goals, an environmental education program would become a series of unrelated experiences, focusing on limited program objectives." Unfortunately, this warning appears to have gone unheeded by numerous environmental education programs and projects, for Childress found in his survey of 301 environmental education programs and projects (3) that less than 40 percent of the programs and projects surveyed considered the following objectives to be primary objectives:

- Synthesizing various alternative solutions to environmental problems into a comprehensive plan.
- Analyzing the role of contributing factors (technology, legislation, etc.) to the causes of environmental problems.
- Evaluating how varying value systems modify and shape the environment.
- Developing proficiency in environmental data collecting techniques.

Childress concluded from his study that:

**objectives focused on helping students become knowledgeable about their environment and its associated problems, and developing an appreciation of environmental resources, were considered of more importance in a majority of programs and projects than were those objectives focused on helping students actually solve environmental problems and develop problem solving skills.**

The lack of emphasis upon objectives which focused on helping students actually solve environmental problems and develop problem solving skills is contrary to the recommendations for environmental education objectives contained in both the 1975 Belgrade Charter and in the 1977 Tbilisi Intergovernmental Conference Report.

The apparent inconsistency between the objectives expressed for and used in EE programs and projects and those recommended by documents such as the Belgrade Charter and the Tbilisi Declaration may be due, in part, to the inherent difficulties confronting a curriculum developer charged with the task of translating what are actually general goals (e.g., to develop environmental awareness, knowledge, attitudes, skills, etc.) into manageable instructional objectives. The difficulties inherent in translating the general goals into instructional objectives have, as Childress has noted (3), resulted in the use of "hunches" as a basis for curriculum planning.

It is the opinion of the writers that curriculum developers and practitioners need a set of intermediate or sub-goals which are more definitive than the general goals usually described for EE. This opinion is consistent with Krathwohl's proposal that a three-tier hierarchy be used for educational objectives (7). Krathwohl's proposed hierarchy consists of 1) general goals, 2) intermediate or sub-goals, and 3) instructional objectives.

Additional support for the need for subgoals for EE came from the Teacher/Leadership Education Working Group during the 1978 National Conference on Environmental Education. Charged with the responsibility of aiding in the development of a national strategy for EE, this working group expressed the need for subgoals which could be used in curriculum planning. To meet this need the Group recommended that the original Goals for Curriculum Development in Environmental Education (Hungerford, Peyton and Wilke, 1978) be revised as needed, validated, and used to meet the need for subgoals for curriculum development.

It is, therefore, the intent of this article to present 1) the Goals for Curriculum Development in Environmental Education, 2) the assumptions made in developing the goals, 3) the developers' validity comparison between the goals and the Tbilisi objectives for EE, and 4) the results of a subsequent validity assessment by a panel of five nationally recognized environmental educators.

**Goals for Curriculum Development in Environmental Education**

The **Superordinate Goal**: ... to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

**Level I. Ecological Foundations Level**

This level seeks to provide the receiver with sufficient ecological foundations knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

The Ecological Foundations Level would minimally include the following conceptual components:

A. Individuals and populations.
B. Interactions and interdependence.
C. Environmental influences and limiting factors.
D. Energy flow and materials cycling (biogeochemical cycling).
E. The community and ecosystem concepts.
F. Homeostasis.
G. Succession.
H. Man as an ecosystem component.
I. The ecological implications of man’s activities and his communities.

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HUNGERFORD, PEYTON AND WILKE

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APPENDIX F

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PLANTLIFE

Threatened Species
Endangered Species
Extinct Species
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SUGGESTED READINGS
ENVIRONMENTAL SCIENCE

In the preparation of elementary teachers who are capable of teaching environmental education, there is probably not one general education course more important than basic environmental science. In addition, such a course has very real general education value, making it almost as appropriate for all collegiate undergraduates as it is for the preservice teacher education programme. By its very nature it is highly interdisciplinary, integrating content from the social studies, biological sciences, physical sciences, and earth sciences. In addition, it has great potential for infusing language arts if the instructor utilizes meaningful activities centered around debate, panel discussions, and report writing.

The content of an environmental science course should probably be weighted for issues which are of significant importance both regionally and internationally. It is very important for the preservice teacher to have a holistic view of the environment from an issues perspective. If this is not accomplished, the classroom teacher may focus on issues which have interest and local importance only without helping children understand the global nature of the numerous environmental crises facing mankind.

It appears extremely important for the environmental science course to have at least the courses in the biological sciences as prerequisites. Doing so should guarantee that the preservice teachers come to environmental science with a reservoir of ecological concepts at their disposal. These concepts are, of course, foundational to a thorough understanding of issues.

Recommended Course Content: A Review of Critical Ecological Concepts:
The Global Nature of Environmental Issues: the phenomenon called "entropy", an introductory overview of critical global issues including: population, land use management, world hunger, energy resources, rain forest management, water resources, pollution, and wildlife management. Population: population dynamics, relationships between population, pollution, resource use, technology, and health; the concept of an sustainable world population, human population control, variables conflicting with population control, critical issues to be resolved. Land Use Management: land use in developed and developing nations, the role of parks, wilderness, and wildlife refuges; urbanization and urban growth, zoning, problems in the urban environment, strip mining and reclamation, the relationships between population and land use management. World Hunger: the relationships between food supplies and world hunger, relationships between population size and hunger, problems associated with various agricultural systems, benefits of various agricultural systems, problems associated with cultivating more land and increasing crop yields, problems associated with pesticide usage, the critical nature of soil erosion, the limits to sustainable fisheries. Energy Resources: types of energy resources, how man has applied various energy resources, benefits and problems associated with technology and energy production, the limits to fossil fuels, alternatives to fossil fuels and attendant problems, the role of solar energy in all its forms, developing a regional and global energy plan. The Tropical Rain Forest: distribution, ecological impact of the rain forest, economics of preservation vs development, the rain forest as species habitat, development and extinction, management problems and the potential for resolving these problems. Water Resources: worldwide supply, distribution and use of water, issues associated with water including soil salinity, use of fossil water supplies, water diversion, surface water pollution, groundwater pollution, and dams. Air and Noise Pollution: types of pollution, effects of smog and other forms of air pollution, acid rain and its consequences, noise and its effects on human beings, regional issues associated with air and noise pollution. Wildlife Management: the ecological role and benefits of wildlife, endangered species, habitat destruction, over-utilization, extinction, the need for preserving gene pools, feral animal problems, protection and management of game and nongame species, regional issues associated with wildlife
(including fisheries management). **Economics, Politics, and Environmental Ethics:** national and international costs associated with environmental degradation, costs of resolving problems/issues, future costs if improvements are not made, the role of politics in environmental decision-making, using the political process for initiating change, components of an environmental ethic, the need for appropriate life styles, influencing change at the local/regional levels.

**Environmental Goals to be Facilitated:** Upon completion of the teacher education programme, the teacher is expected to be able to...

2. apply a knowledge of ecological concepts to the analysis of environmental issues and identify important ecological principles involved.

3. apply a knowledge of ecological concepts in predicting the ecological consequence of alternative solutions to environmental problems.

5. understand and communicate how man's cultural activities (e.g., religious, economic, political, social, etc.) influence the environment from an ecological perspective.

6. understand and communicate how an individual's behaviors impact on the environment from an ecological perspective.

7. identify a wide variety of local, regional, national and international environmental issues and the ecological implications of these issues.

8. identify and communicate the viable alternative solutions available for remediating crucial environmental issues as well as the ecological and cultural implications of these various solutions.

11. understand the need for responsible citizenship action in the solution of environmental issues.

**Sample Learner Objectives:** Subsequent to the completion of this course, the preservice elementary teacher should be able to...

1. describe the relationship that exists between the loss of tropical rain forests and species extinction.

2. cite one example of man's depletion of a fossil water supply and the agricultural implications of this depletion.

3. describe specific examples of the impact that feral horse and burro populations have had on western U.S. ecosystems. [This objective or a similar one can be used to evaluate students' knowledge of the impact any feral population has had/is having on a given man-made or naturally existing ecosystem.]

4. compare and contrast, in ecological terms, monobiotic agricultural ecosystems with the more complex, naturally existing ecosystems. Emphasis should be given to species diversity, long-term stability, resistance to external variables, and biogeochemical cycling.

5. using a variety of secondary sources - evaluate the degree to which solar energy applications have decreased U.S. dependence on fossil fuels, e.g., coal, gas, and oil.
The Formation of Holistic Objectives

Teachers can design holistic teaching practices by combining objectives in all three domains: the cognitive (thinking), the affective (feeling), and the psychomotor (kinesthetic, tactile, and/or physical). Educational objectives can be written as behavioral (those using explicit verbs), as problem-solving, or as expressive outcome objectives.

I. Cognitive behavioral objectives divided into subsets according to Bloom’s Taxonomy. This area is concerned with knowledge or thought.

Knowledge: Remembering previously learned material.

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<tr>
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<th>define</th>
<th>record</th>
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</tr>
<tr>
<td>list</td>
<td>repeat</td>
<td>acquire</td>
</tr>
</tbody>
</table>

Comprehension: The ability to grasp the meaning of material.

<table>
<thead>
<tr>
<th>restate</th>
<th>identify</th>
<th>illustrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>locate</td>
<td>discuss</td>
<td>interpret</td>
</tr>
<tr>
<td>report</td>
<td>describe</td>
<td>draw</td>
</tr>
<tr>
<td>recognize</td>
<td>report</td>
<td>represent</td>
</tr>
<tr>
<td>explain</td>
<td>review</td>
<td>differentiate</td>
</tr>
<tr>
<td>express</td>
<td>infer</td>
<td>conclude</td>
</tr>
</tbody>
</table>

Application: The ability to use learned material in new and concrete situations.

<table>
<thead>
<tr>
<th>apply</th>
<th>organize</th>
<th>practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>relate</td>
<td>employ</td>
<td>calculate</td>
</tr>
<tr>
<td>develop</td>
<td>restructure</td>
<td>show</td>
</tr>
<tr>
<td>translate</td>
<td>interpret</td>
<td>exhibit</td>
</tr>
<tr>
<td>use</td>
<td>demonstrate</td>
<td>dramatize</td>
</tr>
<tr>
<td>operate</td>
<td>illustrate</td>
<td></td>
</tr>
</tbody>
</table>

Analysis: The ability to break down material into its component parts so that its organizational structure may be understood.

<table>
<thead>
<tr>
<th>analyze</th>
<th>differentiate</th>
<th>experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>compare</td>
<td>contrast</td>
<td>scrutinize</td>
</tr>
<tr>
<td>probe</td>
<td>investigate</td>
<td>discover</td>
</tr>
<tr>
<td>inquire</td>
<td>detect</td>
<td>inspect</td>
</tr>
<tr>
<td>examine</td>
<td>survey</td>
<td>dissect</td>
</tr>
<tr>
<td>contrast</td>
<td>classify</td>
<td>discriminate</td>
</tr>
</tbody>
</table>
Synthesis: The ability to put parts together to form a new whole.

compose plan propose
produce invent develop
design formulate arrange
assemble collect construct
create set up organize
prepare generalize originate
predict document derive
modify combine write
tell relate propose

evaluation: The ability to judge the value of material for a given purpose.
judge argue validate
assess decide consider
compare choose appraise
evaluate rate value
conclude select criticize
measure estimate infer
deduce

II. Affective objectives can also be divided into a hierarchy (according to Kratwohl). This area is concerned with feelings of emotions.

receiving: This refers to the learner's sensitivity to the existence of stimuli - awareness, willingness to receive, or selected attention.

feel pursue
sense attend
capture perceive
experience

responding: This refers to the learners active attention to stimuli - acquiescence, willing responses, or feelings of satisfaction.

conform contribute
allow enjoy
cooperate satisfy
Valuing: This refers to the learner's beliefs and attitudes of worth - acceptance, preference, or commitment.

believe respect
seek search
justify persuade

Organization: This refers to the learner's internalization of values and beliefs involving (1) the conceptualization of values; and (2) the organization of a value system.

examine create
clarify integrate
systematize

Characterization: This refers to the learner's highest of internalization and relate to behavior that reflects (1) a generalized set of values; and (2) a characterization or a philosophy about life.

internalize resolve
review judge
conclude

III. Psychomotor objectives are concerned with the physical encoding of information, movement and activities where the gross and fine muscles are used for expressing or interpreting information or concepts. This area also refers to natural, autonomic responses or reflexes. (Based on Harrow).

Reflex Movements: Objectives at this level include reflexes that involve one segment of the spine and movements that may involve more than one segmented portion of the spine (e.g. voluntary muscle contraction).

Fundamental Movements: Objectives in this area refer to skills or movements or behaviors related to walking, running, jumping, pushing, pulling and manipulating.

Perceptual abilities: Objectives in this area should address skills related to kinesthetic (bodily movements), visual, auditory, tactile (touch), or coordination abilities.

Physical abilities: Objectives in this area should be related to endurance, flexibility, agility, strength, reaction-response time or dexterity.

Skilled movements: Objectives in this area refer to games, sports, dances, and/or the arts.

Nondiscursive communication: Objectives in this area refer to expressive movement through posture, gestures, facial expressions, and/or creative movements.
<table>
<thead>
<tr>
<th>KRATHWOHL'S TAXONOMY of THE AFFECTIVE DOMAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHARACTERIZING</td>
</tr>
<tr>
<td>INTERNALIZE, REVIEW, JUDGE, RESOLVE, CONCLUDE</td>
</tr>
<tr>
<td>ORGANIZING</td>
</tr>
<tr>
<td>EXAMINE, CLARIFY, CREATE, SYSTEMATIZE, INTEGRATE</td>
</tr>
<tr>
<td>VALUING</td>
</tr>
<tr>
<td>BELIEVE, RESPECT, SEEK, SEARCH, JUSTIFY, PERSUADE</td>
</tr>
<tr>
<td>RESPONDING</td>
</tr>
<tr>
<td>CONFORM, ALLOW, COOPERATE, CONTRIBUTE, ENJOY, SATISFY</td>
</tr>
<tr>
<td>RECEIVING</td>
</tr>
<tr>
<td>FEEL, SENSE, CAPTURE, EXPERIENCE, PURSUE, ATTEND, PERCEIVE</td>
</tr>
</tbody>
</table>
### TABLE 7.2 Taxonomy for the Affective Domain: Objectives and Outcomes

<table>
<thead>
<tr>
<th>Component</th>
<th>General Actions</th>
<th>Specific Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving (Attending)</td>
<td>Shows awareness of distinctive features</td>
<td>Describes, identifies, selects, points to</td>
</tr>
<tr>
<td>Responding</td>
<td>Accepts need for regulations and responsibilities</td>
<td>Complies, tells, performs</td>
</tr>
<tr>
<td>Valuing</td>
<td>Endorses propositions</td>
<td>Explains, justifies, shares, initiates</td>
</tr>
<tr>
<td>Organization</td>
<td>Understands relationships between values</td>
<td>Explains, defends, organizes</td>
</tr>
<tr>
<td>Value Complex</td>
<td>Acts in ways consistent with values</td>
<td>Displays, practices, performs</td>
</tr>
<tr>
<td>Example: (Valuing)</td>
<td>Shows concern for the welfare of the less fortunate</td>
<td>Reads reports on causes of homelessness</td>
</tr>
</tbody>
</table>

### TABLE 7.3 Taxonomy for the Psychomotor Domain: Objectives and Outcomes

<table>
<thead>
<tr>
<th>Component</th>
<th>General Actions</th>
<th>Specific Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception (Attending)</td>
<td>Recognizes significant cues</td>
<td>Chooses, detects, identifies, differentiates, demonstrates</td>
</tr>
<tr>
<td>Set</td>
<td>Relates cues to actions</td>
<td>Begins, proceeds, starts, volunteers, shows, demonstrates</td>
</tr>
<tr>
<td>Guided Response</td>
<td>Displays mental readiness to perform</td>
<td>Assembles, fixes, manipulates</td>
</tr>
<tr>
<td>Mechanism</td>
<td>Displays physical readiness to perform</td>
<td>Assembles, fixes, manipulates, mends</td>
</tr>
<tr>
<td>Complex Response</td>
<td>Displays emotional readiness to perform</td>
<td>Alters, varies, revises</td>
</tr>
<tr>
<td>Adaptation</td>
<td>Imitates a response</td>
<td>Originates, composes, constructs, devises</td>
</tr>
<tr>
<td>Organization</td>
<td>Experiments with responses</td>
<td>Changes racquet grip to impart different spin</td>
</tr>
<tr>
<td>Example: (Adaptation)</td>
<td>Performs task habitually</td>
<td>Alters stance to better return opponent's shot</td>
</tr>
<tr>
<td></td>
<td>Performs with confidence and proficiency</td>
<td>Rushes net more often than usual</td>
</tr>
<tr>
<td>TABLE 7.1 Taxonomy for the Cognitive Domain: Objectives and Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>Knows terms</td>
<td>Defines, names, states, identifies, describes, outlines, reproduces</td>
</tr>
<tr>
<td>Knows specific facts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knows rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knows trends and sequences</td>
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<tr>
<td>Knows classifications and categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knows methods and procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>Translates communications</td>
<td>Paraphrases, converts, explains, predicts, generalizes, infers</td>
</tr>
<tr>
<td>Interprets relationships</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understands facts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Applies principles</td>
<td>Uses, solves, constructs, prepares, demonstrates</td>
</tr>
<tr>
<td>Analysis</td>
<td>Analyzes organization and relationships</td>
<td>Discriminates, outlines, diagrams, differentiates, infers, subdivides</td>
</tr>
<tr>
<td>Recognizes unstated assumptions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synthesis</td>
<td>Produces new arrangements</td>
<td>Designs, organizes, rearranges, compiles, modifies, creates</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Judges on basis of external criteria</td>
<td>Appraises, compares, contrasts, discriminates, criticizes, justifies</td>
</tr>
<tr>
<td>Judges on basis of evidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: (Comprehension)</td>
<td>Understands the meaning of a constitutional democracy</td>
<td>Paraphrases the contents of a country's constitution</td>
</tr>
<tr>
<td>Explains the functions of various branches of government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gives an example of a constitutional democracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explains how to convert a dictatorship into a constitutional democracy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
OUTCOME BASED OBJECTIVE TERMS

demonstrate  
evaluate  
define  
discuss  
list  
document  
clarify  
design  
determine  
modify  
compare/contrast  
describe  
articulate  
interpret  
use critical thinking to

explore  
experiment  
review  
create  
develop  
implement  
process  
model  
establish  
identify  
explain  
apply ____ to ______

participate in  
relate ____ to ______

access information to match
Tbilisi-Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

Knowledge (goals WE wrote for our scope and sequence)
1. To develop students' knowledge of ecological principles as they relate to environmental issues and the consequences.
   
   1 - Acquire information about the living (biotic) and non-living (abiotic) substance of the natural environment.
   2 - The students will develop an understanding of the interrelatedness of the Earth's systems and how they function.
   3 - The students will develop an understanding of human impact and responsibilities relative to the environment.

MANITOWOC
K State that living things depend on water, air, food, light, and temperature.
   Recognize that living things live in different surroundings which we must take a part in preserving.

1 Identify the relationship between the animal and its environment.
   Recognize that plants and animals are dependent upon each other.
   Recognize that animals live in different habitats and may be dependent on people for food, shelter, and water; to develop insight into our responsibilities toward preserving the animal habitats.
   Recognize that plants live in various habitats and may need human management for survival.

2 Recognize that weather results in changes in our environment.
   Identify how the rays of the sun affect living things.
   Recognize that heat and light are essential to all living things.
   Develop the concept that natural resources can be preserved or consumed by people.

3 Be aware of natural effects on environment and ecosystems. (weather, erosion, fire, flood, etc.)
   Explain the role of the sun on the environment.
   Recognize that nonrenewable resources must be used wisely.
Describe community facilities and procedures that ensure safe water supplies, and sanitary trash and sewage disposal.
Demonstrate and explain the water system and its importance to our environment.
4 Describe the negative effects of our use of the earth: pollution, erosion, waste.
   Explain the role of the sun in the environment: water cycle, photosynthesis.
   Identify practices of energy conservation at home, in school, or elsewhere.
   Identify basic survival needs and the components of a specific habitat: food, water, shelter and space.
   Identify how natural resources help fill people's basic needs of food, clothing and shelter.
   Recognize how dependent we are on any one natural resource.
   Explain the importance of conservation.
5 Describe the negative effects of our use of the earth: pollution, erosion, weathering, waste.
   Identify practices of energy conservation at home, in school, or elsewhere.
   Debate both sides of conflicts between recreational and commercial use of the environment.
   Identify the basic survival needs and components of a specific habitat.
   Recognize that humans and wildlife share the environment and contribute to the environment's ecological succession.
   Recognize that most resources cannot be easily or quickly replaced.
   Endangered wildlife and dwindling resources can be refurbished and conserved with human intervention.
6 Understand importance of rain forest to world economy.
   Classify resource as renewable or nonrenewable.
   Know some ways you can preserve the world's resources.
   Recognize the need to protect wildlife from extinction.
   Identify and describe some causes for extinction of animal species.
   Name threatened and endangered species living in their area.
   Identify and evaluate ways that litter pollution can endanger wildlife.
   Propose ways that they can help eliminate these dangers.
7 Explore your community.
Role play migration.
Learn about bears and their cubs.
Determine reasons for conserving water.
Make inferences about adaptations.
Understand carrying capacity in animals.
Calculate water volumes.

8 Describe the importance of water conservation.
Recognize spiders.
Interpret data.
Explore community resources.
Discuss urbanization.
Recognize aquatic pollution.
Trace food to its source.

9 State in writing the economic value of the oceans.
State verbally and in writing with understanding the pros and cons of nuclear power plants.
Write about the interaction of environmental systems.
State in writing the economic value of oceans.
State verbally and in writing with understanding the pros and cons of nuclear power plants.
Write or explain how crude oil is obtained, importance to our energy needs, how it affects our standard of living, and what can be done to conserve it.
State in writing the extent of energy use at home and appreciate ways of using that energy wisely.

10-12 Recognize factors which act to control life in an environment.
Correctly explain what happens in an environment when populations become too large.
Explain how the use of natural resources may affect the environment.
Distinguish between renewable and nonrenewable resources.
Recognize ways in which humans can improve their environment.
TABLE 1.—Middle School Infusion Possibilities for Year One: Ecological Foundations and Man as an Ecological Factor

<table>
<thead>
<tr>
<th>Outline topic</th>
<th>Science</th>
<th>Health</th>
<th>Social studies</th>
<th>Math</th>
<th>Language arts</th>
<th>Home economics</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. What is ecology? What do ecologists do?</td>
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<td></td>
</tr>
<tr>
<td>A. Defining &quot;ecology&quot;</td>
<td>X</td>
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<tr>
<td>B. The role of ecologists</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>II. Individuals, populations, and levels of organization in ecology</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>III. The &quot;ecosystem concept&quot; developed</td>
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<tr>
<td>A. Importance of the concept</td>
<td>X</td>
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<tr>
<td>B. Local/regional ecosystems</td>
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<tr>
<td>C. Components of ecosystems</td>
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<tr>
<td>D. Ecological niches</td>
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<tr>
<td>E. Competition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F. Tolerance ranges</td>
<td></td>
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<tr>
<td>IV. Energy and ecosystems</td>
<td></td>
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<tr>
<td>A. The need for energy</td>
<td>X</td>
<td></td>
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<tr>
<td>B. The sun as the source</td>
<td></td>
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<tr>
<td>C. Green plants as the basis</td>
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<tr>
<td>D. Energy losses</td>
<td></td>
<td></td>
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<tr>
<td>E. Net primary productivity</td>
<td></td>
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<tr>
<td>V. Ecological succession</td>
<td></td>
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</tr>
<tr>
<td>A. Succession as a natural phenomenon</td>
<td>X</td>
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<tr>
<td>B. Succession as an orderly phenomenon</td>
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<tr>
<td>C. Major categories</td>
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<tr>
<td>D. A comparison of stages</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>VI. Populations and their dynamics</td>
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<tr>
<td>VII. Man as an ecological factor</td>
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</tr>
<tr>
<td>A. Man as a powerful variable</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>B. Man as an eruptive population</td>
<td>X</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>C. Consequences of eruptive human populations</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>D. Man and the world's soils</td>
<td></td>
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<tr>
<td>E. Man and the world's forests</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>F. Man and the world's wetlands</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>G. Man and the world's wildlife</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>H. Critical considerations</td>
<td>X</td>
<td></td>
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</tr>
</tbody>
</table>
Knowledge Strand

The functional environmentally literate citizen, in addition to the knowledge of the nominally literate, has knowledge of and understanding of a number of ecological, economic, geographic, religious, educational and political processes and understanding of the effects/impacts of humans on natural systems, including:

- Population dynamics.
- Interactions.
- Interdependence.
- Limiting factors.
- Energy transfers, production, storage, and degradation.
- Biogeochemical cycling.
- Communities.
- Ecosystems.
- Succession.
- Homeostasis.
- Man as ecological variable.
- Uneven distribution of resources globally.
- Understanding dynamic relationships between science, technology, and society.
- Understanding of the process of scientific inquiry.
- Awareness of and concern about economic, social, political, and Ecological interdependence in urban and rural areas.
- Distinguishing between territory and map (a thing and its representation).
- Thinking in terms of systems.
- Thinking in terms of time frames or scales.
- Awareness of appropriate time/rate determiners for changes desired.
- Thinking critically and creatively.
- Consequences of individual actions.
- Human/personal impacts individually and collectively, in terms of an ecological perspective:
  - population.
  - political decisions.
  - energy sources and uses.
  - conservation.
  - waste streams.
  - recycling.
  - transportation.
- Human cultural activities influence the environment from an ecological perspective.
- Basic numeracy and scale.

Level I. Ecological Foundations Level

This level seeks to provide the receiver with sufficient ecological foundations knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

The Ecological Foundations Level would minimally include the following conceptual components:

A. Individuals and populations.
B. Interactions and interdependence.
C. Environmental influences and limiting factors.
D. Energy flow and materials cycling (biogeochemical cycling).
E. The community and ecosystem concepts.
F. Homeostasis.
G. Succession.
H. Man as an ecosystem component.
I. The ecological implications of man's activities and his communities.
APPENDIX I

ATTITUDES

Tblisi Goal—to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.

Attitudes (The goal we wrote for our district)
1. To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

Valuing Skills (Knapp) Journal of EE

1. Defining terms and analyzing words and phrases for emotional and/or judgmental impact.

2. Examining standards or criteria for establishing what is right or good and analyzing their sources.

3. Empathizing with others holding differing value positions represented in a conflict.

4. Predicting the balance between "good" consequences and "undesirable" consequences resulting from various alternatives proposed to solve value conflicts.

5. Identifying and applying moral principles to specific environmental problems and issues to evaluate how they relate.

6. Examining and evaluating lifestyle patterns and associated value systems in ourselves and others.

7. Finding relevant and accurate facts related to environmental issues and assessing whether or not they support or negate particular actions.

8. Examining value indicators such as personal attitudes, beliefs, ideals, interests, and feelings in relation to personal actions.
9. Examining and evaluating the accomplishments of significant human models (i.e., Rachel Carson, John Muir, Theodore Roosevelt, etc.)

10. Examining issues of authority and group consensus methods of arriving at moral principles and behavior

11. Listing and prioritizing standards for making decisions and examining conflicts among them

12. Identifying broad and basic moral principles to serve as foundation for establishing rules or codes of behavior

13. Identifying value conflicts in everyday life situations

14. Listing reasons for making specific moral choices and listening to the reasons listed by others
### H. The Self is Important

The students will:

<table>
<thead>
<tr>
<th></th>
<th>ATTITUDES OBJECTIVES</th>
<th>Subject Area</th>
<th>K-3</th>
<th>4-6</th>
<th>7-9</th>
<th>10-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.1</td>
<td>Become aware that individuals must practice self-control for the wise use of environmental resources</td>
<td>S, SS, H</td>
<td>M</td>
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</tr>
<tr>
<td>H.2</td>
<td>Develop a healthy self-concept</td>
<td>SS, H, A</td>
<td>M</td>
<td>m</td>
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</tr>
<tr>
<td>H.3</td>
<td>Evaluate what a good quality of life means to them</td>
<td>SS, H, A</td>
<td>M</td>
<td>m</td>
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<tr>
<td>H.4</td>
<td>Identify and clarify their feelings about the environment and its associated problems</td>
<td>S, SS, H</td>
<td>m</td>
<td>M</td>
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<tr>
<td>H.5</td>
<td>Build the motivation and commitment necessary to participate in the improvement of their environment</td>
<td>S, SS, H</td>
<td>m</td>
<td>M</td>
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<tr>
<td>H.6</td>
<td>Become aware that individuals, through their lifestyles, actions, or leadership, can improve or degrade their environment</td>
<td>S, SS, H</td>
<td>m</td>
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</tbody>
</table>

### I. Others are Important

The students will:

<table>
<thead>
<tr>
<th></th>
<th>ATTITUDES OBJECTIVES</th>
<th>Subject Area</th>
<th>K-3</th>
<th>4-6</th>
<th>7-9</th>
<th>10-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.1</td>
<td>Develop respect for the dignity of all human beings</td>
<td>SS, H, A</td>
<td>M</td>
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<tr>
<td>I.2</td>
<td>Gain an appreciation for others' perspectives, cultures, values, and lifestyles</td>
<td>SS, H, A</td>
<td>m</td>
<td>M</td>
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<tr>
<td>Attitudes Objectives</td>
<td>Subject Area</td>
<td>K-3</td>
<td>4-6</td>
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<td>I.3</td>
<td>SS, H</td>
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<tr>
<td>I.4</td>
<td>SS, H</td>
<td>m</td>
<td>M</td>
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<tr>
<td>J. The Environment is Important</td>
<td>S, SS, A</td>
<td>M</td>
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<tr>
<td>J.1</td>
<td>S, SS, A</td>
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<tr>
<td>J.2</td>
<td>S, SS, A</td>
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<td>J.3</td>
<td>S, SS, A</td>
<td>m</td>
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<tr>
<td>J.4</td>
<td>S, SS, A</td>
<td>m</td>
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<tr>
<td>Program Goal B Outcomes - Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.</td>
<td>I - Introduce</td>
<td>E - Extend</td>
<td>M - Master</td>
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<tr>
<td>1. Appraise and give examples of diversity in nature.</td>
<td>I</td>
<td>E</td>
<td>E</td>
<td>M</td>
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<tr>
<td>2. Differentiate appetite (I like), knowledge (I know), ethics (I judge), morals (I act), desire (I want), and necessities (I need), relative to environmental issues.</td>
<td>I</td>
<td>E</td>
<td>E</td>
<td>M</td>
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<tr>
<td>3. Differentiate between waste and resource.</td>
<td>I</td>
<td>E</td>
<td>M</td>
<td>E</td>
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<tr>
<td>4. Demonstrate an understanding of precycling, reducing, reusing, and recycling of resources, and rejecting (whenever possible) materials that are not environmentally sound.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>5. Understand the bonding process between humans and other living things.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>6. Understand the relationships between beliefs, political structures, and environmental values of various cultures.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>7. Describe some cultural differences and their influence on the environment.</td>
<td>I</td>
<td>E</td>
<td>E</td>
<td>E</td>
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<tr>
<td>8. Evaluate an argument where economic and cultural interests either contradict or enhance aesthetic or environmental concerns.</td>
<td>I</td>
<td>E</td>
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<tr>
<td>9. Work cooperatively in groups toward the accomplishment of a goal.</td>
<td>I</td>
<td>E</td>
<td>E</td>
<td>E</td>
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<tr>
<td>10. Identify and evaluate the multiple uses of a resource or site.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>11. Analyze the influence of the mass media on shaping perceptions of the environment.</td>
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<td>E</td>
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<tr>
<td>12. Develop a sense of place - recognize the inherent value of a location - without comparison to other environments.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>13. Express personal perceptions of a place or event that demonstrate an appreciation of the environment.</td>
<td>I</td>
<td>I</td>
<td>E</td>
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<tr>
<td>14. Investigate the environmental history of a site.</td>
<td>I</td>
<td>E</td>
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<td>15. Assess his or her personal commitment to the environment.</td>
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<td>E</td>
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<tr>
<td>16. Develop outdoor recreational skills and ethics.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>MODEL LEARNER OUTCOMES</td>
<td>I = Introduce</td>
<td>E = Extend</td>
<td>M = Master</td>
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<tr>
<td>Program Goal C Outcomes - Learners should understand the cause-and-effect relationship between human behavior and attitudes and the environment.</td>
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<tr>
<td>1. Describe the concept of human population growth and infer future population fluctuations.</td>
<td>I</td>
<td>E</td>
<td>M</td>
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<tr>
<td>2. Identify and analyze the way in which the environment affected the distribution of humans historically.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>3. Describe how modern agriculture and technology affect the land and water.</td>
<td>I</td>
<td>E</td>
<td>M</td>
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<td>4. Describe how manipulating habitat affects animal/plant populations.</td>
<td>I</td>
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<tr>
<td>5. Analyze and relate ways in which environmental problems are caused by unforeseen consequences of human actions.</td>
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<td>E</td>
<td>E</td>
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<tr>
<td>6. Demonstrate knowledge of the renewability of natural cycles and the necessity for establishing sound resource use policies.</td>
<td>I</td>
<td>E</td>
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<tr>
<td>7. Identify those resources subject to overuse, misuse, or change resulting from human intervention in the natural environment.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>8. Describe and analyze environmental threats and hazards after considering the available information.</td>
<td>I</td>
<td>E</td>
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<tr>
<td>9. Define pollutants and describe the effects of varying levels of pollutants on the environment.</td>
<td>I</td>
<td>E</td>
<td>E</td>
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<tr>
<td>10. Understand the concept of exported/imported pollution, e.g., smokestacks, watersheds, and weather systems.</td>
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<td>E</td>
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<tr>
<td>11. Explain a short-term and long-term effect of an environmental action on human social systems.</td>
<td>I</td>
<td>E</td>
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<tr>
<td>12. Describe and evaluate management alternatives that help preserve the earth's finite natural resources.</td>
<td>I</td>
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<tr>
<td>13. Describe how his or her own values influence personal use of resources.</td>
<td>I</td>
<td>E</td>
<td>E</td>
<td>E</td>
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<td></td>
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<tr>
<td>14. Propose a human social system in harmony with the environment.</td>
<td>I</td>
<td>E</td>
<td>M</td>
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<tr>
<td>15. Explore the career/life paths that directly or indirectly imply involvement in making decisions about the environment.</td>
<td>I</td>
<td>E</td>
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<tr>
<td>16. Demonstrate an environmental service to the community and understand that this is a lifelong process.</td>
<td>I</td>
<td>E</td>
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</tbody>
</table>
Nominal environmental literacy specifies a person able to recognize many of the basic terms used in communicating about the environment and able to provide a rough, if unsophisticated, working definition of their meaning. Persons at the nominal level are developing an awareness of and sensitivity toward the environment along with an attitude of respect for natural systems and concern for the nature and magnitude of human impacts on them. They also have rudimentary knowledge of how natural systems work and how human social systems interact with them.

**Knowledge Strand**

Nominally environmentally literate individuals are familiar with:

- The nature of the basic components of elemental systems (e.g., living and non-living things, requirements for life).
- Types and examples of interactions between humans and nature.
- Basic components of societal systems.

**Affect Strand**

Have affective sensitivities about:

- Appreciation of both nature and society.
- Elementary sensitivity and empathy for both nature and society.
- Elemental perceptions of points of conflict between nature and society.

**Skill Strand**

Have skills of:

- Identifying and defining problems.
- Recognizing issues surrounding identified problems or proposed solutions (e.g., latent and visible conflicts).

**Behavior Strand**

Demonstrate:

- Familial, school, and youth organization activities and habits aimed at maintenance of environmental quality.
- Responding and coping behaviors.

The Appendix contains a list of some basic terms nominally literate individuals might be expected to recognize with some degree of understanding. Further examples of basic concepts are to be found in Meadows (1989), Hanseiman, et al (1989), or FICE-
Functional environmental literacy indicates a person with a broader knowledge and understanding of the nature of and interactions between human social systems and other natural systems. They are aware and concerned about the negative interactions between these systems in terms of at least one or more issues and have developed the skills to analyze, synthesize, and evaluate information about them using primary and secondary sources. They evaluate a selected problem/issue on the basis of sound evidence and personal values and ethics. They communicate their findings and feelings to others. On issues of particular concern to them, they evidence a personal investment and motivation to work toward remediation using their knowledge of basic strategies for initiating and implementing social or technological change.

- Identifying alternative solutions and value perspectives.
- Evaluating alternative solutions.
- Conducting basic risk analysis.
- Identifying and clarifying his/her value positions.
- Examining issues from local, national, regional, and international points of view.
- Thinking in terms of systems.
- Demonstrating ability to forecast, to think ahead, plan.
- Thinking critically and creatively.
- Distinguishing between number, quantity, quality, and value.
- Working cooperatively with other people.
- Acting.
- Judging.
- Valuing.
- Articulating personal values.
- Decision-making.

Affect Strand

The functionally environmentally literate demonstrate such basic affects, attitudes and values as:

- identification with, and feelings of concern for, both society and the environment.
- willingness to recognize and choose among differing value perspectives associated with problems and issues.
- internal locus of control.
- treating public and private property with equal respect.
- sense of stewardship.

Behavior Strand

The functionally environmentally literate moves to action through selected lifestyle activities/behaviors and community/organizational behaviors demonstrated by:

- Taking action positions and actions based on best available knowledge.
- Taking individual and/or group action through:
  - Persuasion.
  - Consumerism.
  - Political action.
  - Legal action.
  - Environmental.
Operational literacy indicates a person who has moved beyond functional literacy in both the breadth and depth of understandings and skills who routinely evaluates the impacts and consequences of actions; gathering and synthesizing pertinent information, choosing among alternatives, and advocating action positions and taking actions that work to sustain or enhance a healthy environment. Such people demonstrate a strong, ongoing sense of investment in and responsibility for preventing or remediating environmental degradation both personally and collectively, and are likely to be acting at several levels from local to global in so doing. The characteristic habits of mind of the environmentally literate are well ingrained. They are routinely engaged in dealing with the world at large.

Skill Strand

Skills involved with evaluating problems and issues on the basis of available evidence and personal values and skills used in planning, implementing, and evaluating including:

- Using the process skills of scientific inquiry.
- Using ability to forecast, to think ahead, plan.
- Using ability to separate number, quantity, quality, and value.
- Imagining.
- Connecting.
- Valuing and value analysis.
- Using primary and secondary sources of information.
- Using ability to separate fact from opinion.
- Determining the roles played by differing human beliefs and values in environmental issues.

Affect Strand

Affects, attitudes and values that indicate a valuation of both nature and society, a sense of investment in and responsibility for the resolution of problems and issues along with a respect for both nature and society and a willingness to participate in and show a sense of efficacy toward the resolution of problems and issues including:

- Awareness of and sensitivity to the total environment and its allied programs.
- Motivation to actively participate in environmental improvement and protection.
- Taking account of historical perspectives while focusing on current and potential environmental situations.
- Awareness of and sensitivity to the total environment and its allied programs.
- Strong internal locus of control.
- Personal responsibility:
  - recognition of impacts of personal behavior,
  - acceptance of personal responsibility for the impacts,
  - willingness to help correct or avoid negative impacts.
- Balancing love of nature with love of humanity.
- Willingness to curtail some individual short-term privileges for long range public good.
- Perceptual orientation movements from:
  - present to future,
  - society to humanity,
  - isolated phenomena to interacting systems.
- Personal environmental ethics.
- Respect for diversity of human perceptions, learning styles and value systems.

Behavior Strand

Actions that demonstrate leadership in working toward the resolution of problems and issues including:

- Evaluating actions with respect to their impact on quality of life and environment.
- Providing verbal commitments.
- Working to maintain biological and social diversity.
- Comminually examining and reexamining the values of the culture.
- Making decisions based on beneficence, justice, stewardship, prudence, cooperation and compassion.
### TABLE J.—Middle School Infusion Possibilities for Year Three: Issue Investigation and Citizenship Action Training

<table>
<thead>
<tr>
<th>Outline topic</th>
<th>Science</th>
<th>Health</th>
<th>Social studies</th>
<th>Math</th>
<th>Language arts</th>
<th>Home economics</th>
<th>Agriculture</th>
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</thead>
<tbody>
<tr>
<td>I. Environmental problem solving</td>
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<tr>
<td>A. Human-environment interactions</td>
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<td>B. Quality of life vs. quality of the environment</td>
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<td>C. Environmental problems and issues</td>
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<td>D. Issue analysis</td>
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<td>E. Examples of analyzed issues</td>
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<td>F. Applying issue analysis skills</td>
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<td>II. Identifying issues and preparing research questions</td>
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<td>A. Identifying environmental issues</td>
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<tr>
<td>B. Identifying variables associated with environmental issues</td>
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<td>C. Writing research questions</td>
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<td>III. Using secondary sources</td>
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<tr>
<td>A. Secondary sources of issue-related information</td>
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<td>B. Processing information from secondary sources</td>
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<td>X</td>
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<td>C. Reporting secondary source information</td>
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<td>IV. Using primary sources</td>
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<tr>
<td>A. Surveys, questionnaires, and opinionnaires</td>
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<td>B. The interview</td>
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<tr>
<td>C. Selecting the population</td>
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<td>E. Guidelines for decision making</td>
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The Nominally Environmentally Literate

Identifying and defining problems.
Recognizing issues surrounding identified problems or proposed solutions (e.g., latent and visible conflicts).

The functionally environmentally literate demonstrate basic skills in analyzing problems and issues and conducting investigations of problems and issues using primary and secondary resources/strategies such as:

- Identifying environmental issues.
- Seeking historical background of issues.
- Investigating environmental issues.
- Evaluating sources of information.
- Analyzing environmental issues from various perspectives.
- Applying ecological concepts to predicting probable ecological consequences.
- Identifying alternative solutions and value perspectives.
- Evaluating alternative solutions.
- Conducting basic risk analysis.
- Identifying and clarifying his/her value positions.
- Examining issues from local, national, regional, and international points of view.
- Thinking in terms of systems.
- Demonstrating ability to forecast, to think ahead, plan.
- Thinking critically and creatively.
- Distinguishing between number, quantity, quality, and value.
- Working cooperatively with other people.
- Acting.
- Judging.
- Valuing.
- Articulating personal values.
- Decision-making.

Skills involved with evaluating problems and issues on the basis of available evidence (facts), and personal values and skills used in planning, implementing, and evaluating solutions, including:

- Using the process skills of scientific inquiry.
- Using ability to forecast, to think ahead, plan.
- Using ability to separate number, quantity, quality, and value.
- Imagining.
- Connecting.
- Valuing and value analysis.
- Using primary and secondary sources of information.
- Using ability to separate fact from opinion.
- Determining the roles played by differing human beliefs and values in environmental issues.
Level II. Conceptual Awareness Level—Issues and Values

This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.

Goals at this level are formulated to provide opportunities for receivers to conceptualize:

A. the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information) and to synthesize the data gathered.
B. the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
C. the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions.
D. the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.
E. the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions.
F. the ability to evaluate, clarify, and change their own values positions in light of new information.

Component B: Goals for Component B are to provide receivers with opportunities to:

G. participate in environmental issue investigation and evaluation.
H. participate in the valuing process in a manner as to permit the receiver to evaluate the extent to which his/her values are consistent with the superordinate goal of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level III. Investigation and Evaluation Level

This level provides for the development of the knowledge and skills necessary to permit receivers to investigate environmental issues and evaluate alternative solutions for remediating these issues. Similarly, values are clarified with respect to these issues and alternative solutions. Goals at this level are presented in two components.

Component A: Goals for Component A are to develop in receivers:

A. the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information) and to synthesize the data gathered.
B. the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
C. the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions.
D. the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.
E. the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions.
F. the ability to evaluate, clarify, and change their own values positions in light of new information.

Component B: Goals for Component B are to provide receivers with opportunities to:

G. participate in environmental issue investigation and evaluation.
H. participate in the valuing process in a manner as to permit the receiver to evaluate the extent to which his/her values are consistent with the superordinate goal of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level IV. Environmental Action Skills Level—Training and Application

This level seeks to guide the development of those skills necessary for receivers to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment. Goals at this level are presented in two components.

Component A: The goal for Component A is to develop in receivers:

A. those skills which will permit them to effectively work toward ends which are consistent with their values and take either individual or group action when appropriate, i.e., persuasion, consumerism, political action, legal action, or ecomanagement.

Component B: The goals for Component B are to provide receivers with opportunities to:

B. make decisions concerning environmental action strategies to be used with respect to particular environmental issues.
C. apply environmental action skills to specific issues, i.e., to take citizen action on one or more issues.
D. evaluate the actions taken with respect to their influence on achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment.

Assumptions Made By the Developers

The following assumptions have been made relative to the goals:

1. That the goals for curriculum development in EE are appropriate for use in guiding both formal and nonformal EE curriculum development efforts.
2. That a “receiver” can be thought of as any person, of any age, who can be reached through either the formal or nonformal educational sectors.
skeleton for a number of other interdisciplinary and multidisciplinary activities.

**The Issue Investigation Skill Format**

The case study approach to issue investigation focuses on only issue category, for example, timber wolf reintroduction. The issue itself is the intent of case study instruction. As such, the instructional activities are issue specific. In contrast, the investigation skill methodology employs a broader, more generalizable approach to the process of issue investigation. The intent of the issue investigation methodology is to develop in students the capabilities (skills) in issue investigation and resolution—capabilities that can be used throughout their lives as citizens.

Like the case study approach, the investigation skill format uses instructional activities structured around the four issue instruction goal levels described earlier. However, unlike the case study approach, the investigation skill method defines, practices, and applies the generic knowledge and skills needed by students to independently investigate and resolve issues. This process culminates in an investigation of a science-related social issue of the student’s own choosing and the development of an action plan for resolving that issue.

The investigation skill methodology for grades 6–12 has been formalized and published, that is, *Investigating and Evaluating Environmental Issues and Actions: Skill Development Modules* (Hungerford et al. 1988). The investigation skill program is organized into a series of six modules. The modules are interdisciplinary in nature and introduce students to the characteristics of issues and the skills needed for obtaining and processing information, investigating and analyzing issues, and issue resolution. The following descriptions provide a brief overview of each module:

**Module I. An Introduction to Issue Investigation.** Students discriminate among events, problems, and issues. The impact of beliefs and values on environmental issues is explored and issue analysis is introduced and practiced. The concept of “interaction,” so crucial in the sciences and social studies, is also introduced, demonstrated, and applied.

**Module II. The Basics of Issue Investigation.** Students identify environmental issues, write research questions, learn how to gain information from secondary sources as well as learn how to compare and evaluate information sources.

**Module III. Using Surveys, Opinionnaires, and Questionnaires.** Students learn how to obtain information using primary methods of investigation. Initially, they learn how to develop surveys, opinionnaires, and questionnaires. Subsequently, they learn sampling techniques and how to administer data collection instruments, as well as how to record these data.

**Module IV. Interpreting Data.** Students learn how to draw conclusions, make inferences, and formulate recommendations. Further, they learn how to produce and interpret graphs.

**Module V. Investigating an Issue.** Students autonomously select and investigate an environmental issue. This process involves the application and synthesis of the skills learned thus far.

**Module VI. Issue Resolution Training.** Students learn the major methods of citizenship action, analyze the effectiveness of individual versus group action, and develop issue resolution action plans. This “action plan” is evaluated against predetermined criteria to assess social, cultural, and ecological implications of citizenship actions. Finally, the action plan may be implemented at the discretion of the student.

This skill development approach provides a powerful vehicle for the investigation of a multitude of different science-related issues by students. The effectiveness of this methodology has been validated by research findings that indicate that issue investigation training fosters responsible and independent citizenship behavior on the part of seventh and eighth grade students (Ramsey, Hungerford, and Tomera 1981). The investigation skill approach is probably more effective at fostering responsible citizenship behavior than the case study approach. The case study typically focuses on a single issue selected by the teacher, thus delimiting exposure to an array of issues investigated by classmates and the ownership that comes with identifying and investigating one’s own issue.

Most instructional methods, including the investigation skill approach, have a variety of problems and limitations. Teachers have typically found that a complete 18-week semester is needed to complete the instructional objectives in the skill development program. Thus, this type of program must be inserted into the curriculum. Further, a variety of classroom management skills are critical in those aspects of instruction where the teacher acts as a facilitator between resources and students in the process of investigating an array of science-related social issues. In particular, some teachers have found it difficult to make the transition from direct instruction to a role that demands advising and consulting. Allowing students to investigate issues independently is evidently viewed as unfamiliar departure from the "traditional" classroom management practiced by many teachers.

Consider the vignettes of individuals or teams of students conducting independent investigations as a function of learning issue investigation skills in the middle-school classroom. Vignette I serves as an example of how environmental education can be infused into the classroom. The curricular vehicle, in this case, was a teacher-developed case study that closely adhered to the
### Behavior Strand

**demonstrate:**

- Familial, school, and youth organization activities and habits aimed at maintenance of environmental quality.
- Responding and coping behaviors.

**Actions that demonstrate leadership in working toward the resolution of problems and issues including:**

- Evaluating actions with respect to their impact on quality of life and environment.
- Providing verbal commitments.
- Working to maintain biological and social diversity.
- Continually examining and reexamining the values of the culture.
- Making decisions based on beneficence, justice, stewardship, prudence, cooperation, and compassion.

**The functionally environmentally literate moves to action through selected lifestyle activities/behaviors and community/organizational behaviors demonstrated by:**

- Taking action positions and actions based on best available knowledge.
- Taking individual and/or group action through:
  - Persuasion.
  - Consumerism.
  - Political action.
  - Legal action.
  - Ecomanagement.

### VI. The independent investigation of a student-selected environmental issue

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### VII. Issue resolution: Skills and application

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Objectives for Module VI

Upon completion of your work in Module VI you will be expected to be able to...

1. identify at least two reasons why it is difficult to classify a particular environmental action as positive, negative, or passive.
2. propose one example of an environmental action which could be classified as either positive or negative and defend both of these classifications.
3. define the action method of persuasion and identify at least two examples of strategies which could be used in this category.
4. define the action method of political action and identify at least two examples of strategies which could be used in this category.
5. define the action method of consumerism and identify at least two examples of strategies which could be used in this category.
6. define the action method of ecomanagement and identify at least two examples of strategies which could be used in this category.
7. identify two advantages that group action has over individual action.
8. given any of fourteen action analysis criteria, explain why an individual should consider these before taking any type of environmental action.
9. given a specific example of an environmental action, apply the fourteen action analysis criteria listed in Module VI.
10. identify a given persuasive action as an emotional appeal, logical appeal, coercion, or combination of these.
11. produce an example of an effective persuasive action on some issue which combines both logical and emotional reasons for taking action and follows the appropriate guidelines for persuasive action.
12. describe the dangers of persuasive actions based only on emotion and give one example of an actual environmental issue in which such actions were taken.
13. identify three different kinds (modes) of persuasion and explain how each can best be put to use.
14. identify three categories of consumer action and describe issues for which each category of action is appropriate.
15. describe three kinds of political action and discuss how each of them may be effectively applied to environmental issues.
16. identify three situations in your area which could require ecomanagement type actions.
APPENDIX L

10-3-9

To : Middle School teachers
From : Wayne Verdon
       Dorethy Dewild
       Kathy Forseth
Re : Environmental Education Curriculum ,Scope and Sequence-
     establishing the Sequence

Teachers,

A core committee of teachers from our district have spent the 1993/94
school year writing objectives for the K-8 Environmental Education Curriculum Scope
and Sequence. The committee is aware that many teachers are already infusing
Environmental Education into their classes. An opportunity is being provided for you
to give input to the grade level sequencing of these objectives. This would insure that
if you are already teaching a particular objective, it could be assigned to your grade
level.

Attached is the complete list of objectives for 6-8. You can look it over and jot
down any notes or questions you may have. Note that there are only four targeted
subject areas. Other subjects can be added if you feel an objective would fit
elsewhere. If there are terms that you are unfamiliar with, please circle them. They will
be used to compile a glossary. Take a few minutes to fill out the survey which will help
the core committee to prepare for the inservice that will present and explain the final
Scope and Sequence.

Your input is welcome and necessary. We hope to see you at the October late
start which will meet in the WLC IMC at the second session. If you are unable to
attend, please send this packet with your input along with a teacher who will be
attending.
****** TO PREPARE AN IN SERVICE THAT WILL BENEFIT YOU MOST, YOUR INPUT IS NEEDED! PLEASE PUT A CHECK ON THE LINE OF THE ITEMS YOU FEEL NECESSARY TO ENABLE YOU TO INFUSE EE INTO YOUR CURRICULUM.

1. More knowledge about EE
   _______ Goals
   _______ Background
   _______ Research
   _______ Terminology
   _______ Other______________
   _______________________________________
   _______________________________________
   _______________________________________

2. EE activities
   _______ Active participation in an EE activity
   _______ Simulation of an EE activity
   _______ Activities for proposed outdoor EE sites
   _______ Tour of the WLC outdoor EE school site
   _______ EE activities for the classroom (specific area?:____
   ____________________________________________________
APPENDIX M

EE GRADE/SUBJECT FACILITATOR

Thank you for helping us with the Environmental Education Curriculum K-8. We need and appreciate your participation! What we would like you to do is to facilitate your group (either by grade or subject) to accomplish these tasks:

1. Decide which of the objectives should be taught at your group's grade level.

2. Introduce, Reinforce and Mastery Levels need to be identified for each objective.

3. Designate which subject the objectives should be taught in.

4. If an objective is being taught in a subject not identified in the curriculum, please indicate that subject.

5. Remind teachers to circle any unfamiliar terms for use in a future glossary.
Inservice Activity Resource Bibliography


PLAN IT POETRY

AWARENESS GOALS
Recognize the difference between renewable and non-renewable resources To become aware of the relationship between various components of the earth's ecosystems.

KNOWLEDGE GOALS
Students will develop an understanding of human impact and responsibilities relative to the environment
Recognize how dependent we are on any one natural resource
Identify practices of energy conservation at home, in school or elsewhere
List the various methods used to conserve natural resources

MATERIALS: Poems rewritten on large poster board, drawing paper, crayons.

Procedure:
1. Read the poem chorally. Discuss with students why Mc Freeze was pleased with helping his neighbors. What can children help others do for the environment? Make a class list on chart paper.

There once was a man named Mc Freeze
Who worried about wasting the trees,
He helped all his neighbors
Recycle their papers.
The result made him feel very pleased.

2. List 5-8 endangered animals that the students know. Read the poem, substituting the name of the endangered animal. Ask students their responses to this question.

If a tiger said to you,
"They've ruined my home. What shall I do?
I've nothing to eat and no place to stay."
How would you answer? What would you say?
3. Divide the class into 5 groups. One group will read the stanza of the poem for each verse have students list ways the characters could really have helped the environment.

"Don't waste electricity,"
My mother said to me.
So I turned off my reading light
And went to watch T.V.

"Don't waste the water child,"
Said my dear aunt Rose.
So I skipped my shower and
Just put on clean clothes.

"Don't cut down the rainforest,"
Pleads my brother Gregg.
So we recycle papers but
Still throw out garbage bags.

"Don't waste your gasoline,"
I tried to tell my dad.
So he rode the bus to work,
But I think it made him mad.

Conservation is your job'
Whether Queen or King.
The easiest way to do right,
Is don't waste anything.
**Evaluation:** List three things you could do to help the environment.

**Extension:** *Have students make masks of endangered animals and act out the role of the animal as you read the poem.*

* Adopt an endangered animal. For more information, write to: American Association of Zoological Parks and Aquariums, 4450 Montgomery Ave., Suite 940North, Bethesda, MD 20814

ENVIRONMENTAL EDUCATION CURRICULUM

SCOPE AND SEQUENCE PLAN

SCHOOL DISTRICT OF WAUPACA

GRADES K-8
Goal/Mission

The mission of Environmental Education in the Waupaca School District is to develop student awareness, knowledge, and an appreciation of the earth, resulting in positive attitudes and responsible actions toward the environment.
Aim of Environmental Education

The aim of Environmental Education in the Waupaca School District is to aid citizens in becoming knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic balance between quality of life and quality of the environment.
ENVIRONMENTAL EDUCATION PHILOSOPHY

Environmental education will prepare individuals to be responsive to a rapidly changing technological world, to understand contemporary world problems, and to provide the skills needed to play a productive role, as all citizens must, in the improvement and protection of the environment. In doing so, environmental education must consider all aspects of the environment-natural and built, technological, social, economic, political, cultural, and aesthetic- and acknowledge their interdependence. And environmental education must emphasize an enduring continuity linking action of today to consequences for tomorrow and the need to think in global terms.

To accomplish the above, environmental education programs must be continuous, must infuse Social Studies, Science, Health and Art grades K-8, and must offer students experiences which are as concrete and direct as possible. Students must become involved in an active problem-solving process, investigating real environmental issues and problems in their own community and from a position of neutrality, with no position being advanced in favor over another.

Environmental education must aid young citizens in developing a sense of responsibility and a commitment to the future, and must prepare them to carry out the role of defending and improving the environment on behalf of present and future generations of all living things.
Environmental Education Goals

Awareness
1. To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.
2. The students will use their 5 senses to develop a deep appreciation for the diversity of environments.
3. Students will foster an appreciation for the aesthetic value of the environment.
4. To become aware of the relationship between various components of the Earth's ecosystems.

Knowledge
5. Acquire information about the living (biotic) and non-living (abiotic) substance of the natural environment.
6. The students will develop an understanding of the interrelatedness of the Earth's systems and how they function.
7. The students will develop an understanding of human impact and responsibilities relative to the environment.

Attitudes
8. To develop positive beliefs, attitudes, and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

Skills
9. Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.
10. Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environment issues and problems.

Participation
11. Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.
MASTER LIST OF OBJECTIVES

KINDERGARTEN - 1st - 2nd GRADE

Awareness

Employ and expand student curiosity and use all of their senses in exploring their surroundings (learner directed)
Identify behaviors that lead to harming or helping the environment and how these behaviors can effect us positively or negatively
Use the senses to appreciate the aesthetic quality of the environment
Examine various communities
Identify and classify things that are living and nonliving
Discuss how to be responsible in using land with its limited resources in an ethical manner
Research the idea that earth is a unique planet because it is the only one known to support life
Observe the relationship of how plants and animals depend upon one another within a community
Explain how living things adapt to their environment

Knowledge

Identify human, plant and animal populations
State that living things depend on water, air, food, shelter, light, and temperature
Identify how the sun’s energy affects living things
Identify various communities of living things and how they may need preserving
Identify the relationship between the animal and its environment
Recognize that plants and animals are dependent upon each other
Discuss ways that man can affect a community
Describe what is found on a map and the purpose for different types of maps
Compare and contrast the interdependence in urban and rural areas
Describe populations that make up a community
Recognize that plants live in various habitats and may need human management for survival
Explain that people dispose of wastes into air, water, and soil systems
Attitudes

Demonstrate a respect for all living things in the environment
Evaluate whether a consequence is good or bad for the environment
Examine or evaluate our lifestyles and those of others and how they affect the environment
Identify environmental issues
Identify value conflicts in everyday life situations and how they effect the environment

Skills

Demonstrate the process skills of scientific inquiry
Show the connection between individual actions and impacts upon the environment
Define environmental terms
Forecast, think ahead, and plan for the consequences of environmental issues
Identify environmental issues
Examine environmental issues from a local and regional point of view
Examine local environmental issues
Collect data using interviews, surveys, questionnaires, and opinionaires
Demonstrate the interaction between ecological systems involved in the investigation of an environmental issue

Participation

Communicate an idea which will persuade other students to perform a certain positive environmental action
Make a lifestyle change relating to human effect on the consumer market and record the positive and negative effects of the change
Locate an area in your school building where students will make an environmental change that will improve its quality
3rd-5th GRADE

Awareness

Explain the importance of geography in helping people make decisions about environmental concerns at the local level.
State that humans share environments with wildlife (flora and fauna) and have a positive or negative impact.
Brainstorm current environmental issues and consequences.
Recognize how humans and wildlife depend on our environment to provide many basic needs.
Explore the effects of relationships between technology and environmental issues.
Evaluate influential factors that lead to personal awareness of the environment.
Describe similarities and differences among three habitats that students observe.
Identify similarities and differences between early native Americans and their current lifestyles.
Explore the relationships and the philosophies that indigenous cultures had with their environment.
Identify some aspect of the environment that is found to be personally aesthetic.
Recognize that all living things need space and shelter.
Become aware of energy relationships in ecosystems.
Recognize the difference between renewable and nonrenewable resources.
Give examples of how animals have specific adaptations for survival.
Recognize that each environment has characteristic life forms and identify the populations found in each.
Explore how physical factors, or abiotic factors, influence communities in ecosystems.
Identify the basic needs that all living things find necessary for survival.
Examine how the environment controls wildlife populations by factors of food supply and disease.

Knowledge

Compare and contrast renewable and nonrenewable resources.
Recognize that weather results in changes in our environment.
Define the various factors that influence the relationships between populations and the environment.
Define succession and list example stages of it.
Determine how plants and animals that are specialized to a specific environment can be threatened by environmental changes, natural or induced.
Explore how pollutants affect the water cycle and world atmospheric conditions.
Explore how scientists use the scientific method to study environmental problems.
Identify major types of energy and the technology and resources used to produce them
Recognize how dependent we are on any one natural resource
List the various methods used to conserve natural resources
Distinguish between safe and unsafe waste disposal and how problems result from improper disposal
Define the word aesthetic and explain how it relates to their environment
Identify practices of energy conservation at home, in school, or elsewhere
List ways that some life-styles have a greater impact upon energy sources than others
Identify the multiple uses and misuses of land and its resources
Create a time line of major positive and negative environmental events

Attitudes

Exhibit empathy with others holding different value positions represented in a conflict
Examine and evaluate the accomplishments of significant human models
List different views for making decisions and examine conflicts among them
List reasons for making specific moral choices and listen to the reasons stated by others
Find relevant facts related to environmental issues and assess whether or not they support or negate particular actions
Examine and evaluate the accomplishments of significant human models relating to the area of the environment

Skills

Show the connection between individual actions and impacts
Research historical background of environmental issues
Examine environmental issues from the regional and local point of view
Determine number, quantity, quality and value
Evaluate sources of information regarding the environment
Pick an ecological concept and use it to predict probable ecological consequences
Recognize alternative solutions to any environmental problem and compare and contrast the impacts of the solutions
Apply critical thinking skills to an environmental issue
Identify the roles played by differing human beliefs and values when dealing with a particular environmental issue
Identify categories of consumer action and describe issues for which each category of action is appropriate
Participation

Write a letter to a political figure expressing their view on an environmental issue
Involves students in persuasive approaches for environmental issues
Locate an area on school property and have students take actions to make an environmental change which would improve its quality
Offer students an opportunity to take consumer action on an issue that they feel is important to them personally
Formulate a debate which allows students to analyze both sides of the issue and draw own conclusions on an environmental issue

6th-8th Grade

Awareness

Recognize the challenge of dealing with pollution of the environment
Distinguish between products which have the least and most impact on the environment
Explain how personal lifestyles relate to conserving energy
Become aware of the benefits of preserving and managing forests
Recognize that many career opportunities exist in the bioenvironmental area
Become aware of wildlife management
Explore how philosophies and attitudes have an impact on the environment
Investigate how personal lifestyles impact the environment
Examine whether or not students' philosophies and attitudes are consistent with their behavior
Observe things in our environment
Appreciate the aesthetics of environmental diversity
Become aware of the complex relationships that exist between populations and their environment
Recognize that natural resources are limited

Knowledge

Identify the individuals and populations within the communities found in WI
Diagram the stages included in the biogeochemical cycles
Define the term photosynthesis and how it works tracking the elements involved
Describe the processes of transpiration respiration, how it works and how it relates to the elements cycling within the ecosystem
Describe similarities and differences among the various ecosystems
Identify the components within an ecosystem
Describe energy loss by diagraming food chains and webs
Define ecology and the role of ecologists
Identify practices of energy conservation at home, in school and elsewhere
Recognize the uneven distribution of resources globally
Describe the relationship between economic, social, political, and ecological interdependence in urban and rural areas
Explain appropriate time/rate determiners for desired improvements within the environment
Describe how modern agriculture (chemical and genetics), industry, space, and forestry and their technologies affect the environment (land, water, and air)
Recognize the consequences of individual actions and appropriate measures to critically and creatively solve problems that may arise
Compare and contrast how human cultural activities influence the environment from an ecological perspective

Attitudes

Recognize that the quality of life may be enriched by an aesthetic environment
Deduce that their population is dependent on the decisions they make concerning other populations and the environment
Empathize with others holding different environmental value positions represented in conflict
Appreciate the value of the environment as used for recreation
Consider the value of a clean environment and how this will influence decisions students will make regarding the use of alternative energy technologies
Justify that energy conservation is one solution to insuring energy sources for the future
Realize that there are consequences for not managing waste properly
Perceive that the depletion of the ozone layer is a problem caused and shared by all
Appreciate the shortcomings and benefits of the natural and synthetic chemicals in our environment and how they effect our health
Justify air pollution and its detrimental effects and why it should be monitored and controlled
Realize that the health of rural and urban areas are effected by the growth of urban sprawl
Make personal judgments about the appropriateness of their environmental decisions
Predict the quality of personal health as related to the health of the environment
Assess different land use practices and how they affect the environment
Assess the sources, causes and effects of water pollution that are shared by all things in our environment
Appreciate the differences and similarities of man-made and natural radioactive isotopes, the benefits and consequences of their being introduced into our environment through human activities, and its effect on our health

Skills

Determine what action to take on an environmental issue which incorporates personal values and judgment
Articulate personal values on an environmental issue
Use critical thinking skills to identify point source pollution from ground and surface water
Analyze the risks involved when taking environmental action
Examine environmental issues from local, regional, national, and international points of view
Examine an environmental issue and separate fact from opinion
Identify a given environmental persuasive action as an emotional appeal, logical appeal, coercion, or combination of these
Analyze an environmental issue and explain why an individual should consider all sides before taking any type of action
Make a judgment on your value position of an environmental issue to determine what action to take
Describe political actions and discuss how they may be applied effectively to environmental issues
Identify and clarify individual value positions on an environmental issue
Make a judgment on your value position of an environmental issue to determine what action to take
Evaluate, clarify, and change personal values positions in light of new information, if necessary
Acknowledge the existence of EPA and OSHA regulations and how they affect the environment
Describe political actions and discuss how they may be applied effectively to environmental issues.
Participation

Write a letter to a political figure expressing the students' views on an environmental issue and possible solutions.
Investigate an environmental issue and decide on an action to implement a solution.
Target an environmental issue in your area that requires students to take ecomanagement actions.
**Awareness - Objectives K**

Goal: To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

Identify behaviors that lead to harming or helping the environment and how these behaviors can effect us positively or negatively

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### Awareness - Objectives K

Goal: The students will use their five senses to develop a deep appreciation for the diversity of environments.

Employ and expand student curiosity and use all of their senses in exploring their surroundings (learner directed)

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<td>Goal: Students will foster an appreciation for the aesthetic value of the environment.</td>
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<td>Use the senses to appreciate the aesthetic quality of the environment</td>
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### Awareness - Objectives K

Goal: To become aware of the relationship between various components of the earth’s ecosystems.

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**Knowledge - Objectives K**

Goal: Acquire information about the living (biotic) and non-living (abiotic) substances of the natural environment.

<table>
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<td><strong>Goal:</strong> To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.</td>
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- Demonstrate a respect for all living things in the environment

- Evaluate whether a consequence is good or bad for the environment

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Skills - Objectives

Goal: Learners should analyze, develop and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.

Demonstrate the process skills of scientific inquiry.

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**Participation - Objectives**

**Goal:** Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.

Communicate an idea which will persuade other students to perform a certain positive environmental action. (i.e. poster, video or radio commercial)

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**Awareness - Objectives**

**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

| Identify behaviors that lead to harming or helping the environment and how these behaviors can effect us negatively or positively | S, H |
| Discuss how to be responsible in using land with its limited resources in an ethical manner | S, H |
| Research the idea that earth is a unique planet because it is the only one known to support life | S |

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**Awareness - Objectives**

**Goal:** Students will use their five senses to develop a deep appreciation for the diversity of environments.

<table>
<thead>
<tr>
<th>Employ and expand their curiosity and use of all their senses in exploring their surroundings (learner directed)</th>
<th>Introduce</th>
<th>Reinforce</th>
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**Awareness - Objectives**

**Goal:** Students will foster an appreciation for the aesthetic value of the environment.

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<th>Activity</th>
<th>Introduce</th>
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<tr>
<td>Use the senses to appreciate the aesthetic quality of the environment</td>
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**Key:**
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### Awareness - Objectives 1

**Goal:** To become aware of the relationship between various components of the Earth’s ecosystems.

| Observe the relationship of how plants and animals depend upon one another within a community | S |
| Examine various communities | S |
| Identify and classify things that are living and nonliving | S S |
| Explain how living things adapt to their environment | S |

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### Knowledge Objectives 1

**Goal:** Acquire information about the living (biotic) and non-living (abiotic) substances of the natural environment.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Introduce</th>
<th>Reinforce</th>
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<tbody>
<tr>
<td>State that living things depend on water, air, food, shelter, light, and temperature.</td>
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<tr>
<td>Identify how the sun’s energy affects living things.</td>
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<td>Identify how the sun’s energy affects living things.</td>
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<tr>
<td>Identify human, plant and animal populations</td>
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## Knowledge - Objectives 1

Goal: The students will develop an understanding of the interrelationships of the Earth's systems and how they function.

| Identify various communities of living things and how they may need preserving | S |
| Identify the relationship between the animal and its environment | S |
| Recognize that plants and animals are dependent upon each other | S |

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**Knowledge Objectives**

<table>
<thead>
<tr>
<th>Goal: The students will develop an understanding of human impact and responsibilities relative to the environment.</th>
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<tbody>
<tr>
<td>Explain that people dispose of wastes into air, water, and soil systems</td>
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<tr>
<td>Discuss ways that man can affect a community (i.e.-littering, or clean up projects)</td>
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<tr>
<td>Describe what is found on a map and the purpose for different types of maps (i.e. How to follow a trail map at the school)</td>
</tr>
<tr>
<td>Compare and contrast the interdependence in urban and rural areas (i.e. We need dairy farms for milk products and a city is needed for the manufacturing of the milk.)</td>
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**Attitudes - Objectives 1**

**Goal:** To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

| Demonstrate a respect for all living things in the environment | S |
| Evaluate whether a consequence is good or bad for the environment | S S |
| Examine or evaluate our lifestyles and those of others and how it affects the environment | S, S S |

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### Skills - Objectives

**Goal:** Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

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<th></th>
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<tr>
<td>Identify environmental issues</td>
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<td>Show the connection between individual actions and impacts upon the environment</td>
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Skills - Objectives

Goal: Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.

Define environmental terms

Demonstrate the process skills of scientific inquiry

Forecast, think ahead, and plan for the consequences of environmental issues

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**Participation: Objectives**

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<tbody>
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<td>Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.</td>
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<td>SS, L</td>
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<tr>
<td>Make a lifestyle change relating to human effect on the consumer market and record the positive and negative effects of the change (i.e. choice of snacks or lunch in relationship to packaging-reusable/lunch box; juice box/thermos)</td>
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<tr>
<td>Locate an area in your school building where students will make an environmental change which would improve its quality (i.e. conduct an ecomanagement survey of the school area)</td>
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<td>Communicate an idea which will persuade other students to perform a certain positive environmental action (i.e. poster, video or radio commercial)</td>
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### Awareness - Objectives

**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

Identify behaviors that lead to harming or helping the environment and how these behaviors can effect us negatively and positively

Discuss how to be responsible in using land with its limited resources in an ethical manner

Research the idea that earth is a unique planet because it is the only one known to support life

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**Awareness: Objectives 2**

Goal: The students will use their five senses to develop a deep appreciation for the diversity of environments.

Employ and expand their curiosity and use of all their senses in exploring their surroundings (learner directed)

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Awareness - Objectives**

**Goal:** Students will foster an appreciation for the aesthetic value of the environment.

<table>
<thead>
<tr>
<th>Use the senses to appreciate the aesthetic quality of the environment</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, S</td>
<td></td>
<td></td>
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### Awareness - Objectives 2

**Goal:** To become aware of the relationship between various components of the Earth's ecosystems.

| Observe the relationship of how plants and animals depend upon one another within a community | Introduce | Reinforce | Master |
| Examine various communities | S |
| Identify and classify things that are living and nonliving | S |
| Explain how living things adapt to their environment | S |

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**Goal:** Acquire information about the living (biotic) and the non-living (abiotic) substances of the natural environment.

<table>
<thead>
<tr>
<th>Knowledge - Objectives 2</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>State that living things depend on water, air, food, shelter, light, and temperature</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify how the sun's energy affects living things</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify human, plant and animal populations</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe populations that make up a community (i.e., river community—includes fish, turtles, algae, dragonfly.)</td>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Knowledge Objectives**

**Goal:** The students will develop an understanding of the interrelationships of the Earth's systems and how they function

| Identify various communities of living things and how they may need preserving | S |
| Identify the relationship between the animal and its environment | S, SS |
| Recognize that plants and animals are dependent upon each other | S |
| Discuss how the availability of water, air, soil, and energy in combination will determine where life will be found and the quality of life found. (i.e. plants without water; planets that will not support life.) | S, SS |

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## Knowledge - Objectives 2

**Goal:** The students will develop an understanding of human impact and responsibilities relate to the environment.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize that plants live in various habitats and may need human management for survival (i.e., farming and gardening)</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explain that people dispose of wastes into air, water, and soil systems</td>
<td>S, H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss ways that man can affect a community (i.e., littering, or clean up projects)</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe what is found on a map and the purpose for different types of maps (i.e., How to follow a trail map at the school)</td>
<td>SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compare and contrast the interdependence in urban and rural areas (i.e., We need dairy farms for milk products and a city is needed for the manufacturing of the milk.)</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Attitudes - Objectives**

Goal: To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

| Demonstrate a respect for all living things in the environment | S |
| Examine or evaluate our lifestyles and those of others and how it affects the environment | SS, H |
| Evaluate whether a consequence is good or bad for the environment | SS, S |
| Identify value conflicts in everyday life situations and how they effect the environment (i.e. eating at Hardees v.s. cooking at home) | S, H, SS |

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**Skills - Objectives 2**

**Goal:** Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

<table>
<thead>
<tr>
<th>Identify environmental issues</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Show the connection between individual actions and impacts upon the environment</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S, SS, H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examine environmental issues from a local and regional point of view (i.e. energy conservation in the home or at school: litter, water and electricity conservation)</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SS, S, H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examine local environmental issues (i.e. water quality issue for the Waupaca River)</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S, SS</td>
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### Skills: Objectives 2

**Goal:** Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.

<table>
<thead>
<tr>
<th>Skill / Objective</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define environmental terms</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate the process skills of scientific inquiry</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast, think ahead, and plan for the consequences of environmental issues</td>
<td>S, S</td>
<td>S, H</td>
<td></td>
</tr>
<tr>
<td>Collect data using interviews, surveys, questionnaires, and opinionnaires</td>
<td>L, M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate the interaction between ecological systems involved in the investigation of an environmental issue (i.e. over use of nitrates causes eutrophication which is harmful to aquatic life.)</td>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:**

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**Participation - Objectives 2**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Introduce</th>
<th>Maintain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make a lifestyle change relating to human effect on the consumer market and record the positive and negative effects of the change (i.e. choice of snacks or lunch in relationship to packaging-reusable/lunch box; juice box/thermos)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locate an area in your school building where students will make an environmental change which would improve its quality (i.e. conduct an ecomanagement survey of the school area)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicate an idea which will persuade other students to perform a certain positive environmental action (i.e. poster, video or radio commercial)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Awareness - Objectives 3

**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Relevance</th>
<th>Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS,</td>
<td></td>
<td></td>
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</tbody>
</table>

1. Explain the importance of geography in helping people make decisions about environmental concerns at the local level
2. State that humans share environments with wildlife (flora and fauna) and have a positive or negative impact
3. Brainstorm current environmental issues and consequences
4. Recognize how humans and wildlife depend on our environment to provide many basic needs
5. Explore the effects of relationships between technology and environmental issues
6. Evaluate influential factors that lead to personal awareness of the environment (i.e. going camping, bird watching)

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### Awareness - Objectives 3

**Goal:** The students will use their 5 senses to develop a deep appreciation for the diversity of environments.

| Describe similarities and differences among three habitats that they observe | S |
| Identify similarities and differences between early native Americans and their current lifestyles | SS A |
| Explore the relationships and the philosophies that indigenous cultures had with their environment | SS |

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**Legend:**

- A = Art
- B = Band
- C = Computers
- CH = Choir
- E = English
- F = Family and Consumer Ed.
- H = Health
- L = Language Arts
- M = Math
- PE = Physical Education
- S = Science
- SS = Social Studies
- TE = Technological Education
Goal: Students will foster an appreciation for the aesthetic value of the environment.

Identify some aspect of the environment that is found to be personally aesthetic

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>A</td>
<td></td>
</tr>
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### Awareness - Objectives 3

**Goal:** To become aware of the relationship between various components of the Earth's ecosystems

<table>
<thead>
<tr>
<th>Objective</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize that all living things need space and shelter</td>
<td>S, SS</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Become aware of energy relationships in ecosystems</td>
<td>S</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Recognize the difference between renewable and nonrenewable resources</td>
<td>S</td>
<td>S S</td>
<td></td>
</tr>
<tr>
<td>Give examples of how animals have specific adaptations for survival</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognize that each environment has characteristic life forms and identify the populations found in each</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explore how physical factors, or abiotic factors, influence communities in ecosystems</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify the basic needs that all living things find necessary for survival</td>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
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**Awareness - Objectives 3**

**Goal:** To become aware of the relationship between various components of the Earth's ecosystems

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<tr>
<th></th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examine how the environment controls wildlife populations by factors of food supply and disease</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Knowledge - Objectives 3**

*Goal: Acquire information about the living (biotic) and non-living (abiotic) substances of the natural environment*

<table>
<thead>
<tr>
<th></th>
<th>Introduce</th>
<th>Proficiency</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compare and contrast renewable and nonrenewable resources.</td>
<td>S</td>
<td>S</td>
<td>S S</td>
</tr>
</tbody>
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**Knowledge - Objectives 3**

<table>
<thead>
<tr>
<th>Goal: The students will develop an understanding of the interrelationships of the Earth's systems and how they function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduce</strong></td>
</tr>
<tr>
<td>Recognize that weather results in changes in our environment. (i.e. volcanoes)</td>
</tr>
<tr>
<td>Define the various factors that influence the relationships between populations and the environment</td>
</tr>
<tr>
<td>Define succession and list examples stages of it</td>
</tr>
<tr>
<td>Determine how plants and animals that are specialized to a specific environment can be threatened by environmental changes, natural or induced</td>
</tr>
<tr>
<td>Explore how pollutants affect the water cycle and world atmospheric conditions</td>
</tr>
</tbody>
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Knowledge - Objectives

Goal: The students will develop an understanding of human impact and responsibilities relative to the environment.

| Explore how scientists use the scientific method to study environmental problems | S |
| Identify major types of energy and the technology and resources used to produce them | S, SS |
| Recognize how dependent we are on any one natural resource | S |
| List the various methods used to conserve natural resources | S, SS, H |
| Distinguish between safe and unsafe waste disposal and how problems result from improper disposal | S, SS |
| Define the word aesthetic and explain how it relates to their environment | A |
| Identify practices of energy conservation at home, in school, or elsewhere | S, SS, H |

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<th>Reinforce</th>
<th>Master</th>
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<tbody>
<tr>
<td>Goal: The students will develop an understanding of human impact and responsibilities relative to the environment.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>List ways that some life-styles have a greater impact upon energy sources than others</td>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
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**Goal:** To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

<table>
<thead>
<tr>
<th>Attitudes - Objectives</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhibit empathy with others holding different value positions represented in a conflict</td>
<td>S</td>
<td>SS, H</td>
<td>1</td>
</tr>
<tr>
<td>Examine and evaluate the accomplishments of significant human models (i.e. Aldo Leopold, Rachel Carson, John Muir, Theodore Roosevelt, etc.)</td>
<td></td>
<td></td>
<td>SS, H</td>
</tr>
<tr>
<td>List different views for making decisions and examine conflicts among them (i.e. ways of disposing of trash; composting, incineration)</td>
<td></td>
<td></td>
<td>SS, H</td>
</tr>
<tr>
<td>List reasons for making specific moral choices and listen to the reasons stated by others</td>
<td></td>
<td></td>
<td>SS, H</td>
</tr>
</tbody>
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**Skills - Objectives 3**

Goal: Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reference</th>
<th>Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S, SS, H</td>
<td></td>
</tr>
<tr>
<td>Show the connection between individual actions and impacts</td>
<td>S, SS, H</td>
<td></td>
</tr>
<tr>
<td>Research historical background of environmental issues (i.e. DDT)</td>
<td>S, SS</td>
<td></td>
</tr>
<tr>
<td>Examine environmental issues from the regional and local point of view</td>
<td>S, SS, H</td>
<td></td>
</tr>
</tbody>
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<tr>
<th>Skills - Objectives 3</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal: Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determine number, quantity, quality and value (i.e., interpretation of previously collected data)</td>
<td>M, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate sources of information regarding the environment</td>
<td>SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pick an ecological concept and use it to predict probable ecological consequences (i.e., increase human population leads to environmental degradation)</td>
<td>SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognize alternative solutions to any environmental problem and compare and contrast the impacts of the solutions</td>
<td>S, SS, H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply critical thinking skills to an environmental issue</td>
<td>S, SS</td>
<td>SS, H</td>
<td></td>
</tr>
</tbody>
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**Participation - Objectives**

**Goal:** Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write a letter to a political figure expressing their view on an environmental issue</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involve students in persuasive approaches for environmental issues. (i.e. posters, debate, boycott, strikes, peaceful demonstrations, marches)</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locate an area on school property and have students take actions to make an environmental change which would improve its quality (i.e. improving wildlife habitat, improving conservation practices, school litter clean-up)</td>
<td>S, SS, H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer students an opportunity to take consumer action on an issue that they feel is important to them personally</td>
<td>SS, H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Awareness - Objectives**

Goal: To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

| Explain the importance of geography in helping people make decisions about environmental concerns at the local level | S, SS |
| State that humans share environments with wildlife (flora and fauna) and have a positive or negative impact | SS S |
| Brainstorm current environmental issues and consequences | S, SS |
| Recognize how humans and wildlife depend on our environment to provide many basic needs | SS S |
| Explore the effects of relationships between technology and environmental issues | S, SS |
| Evaluate influential factors that lead to personal awareness of the environment (i.e. going camping, bird watching) | S, SS, A |

A=Art  B=Band  C=Computers  CH=Choir  E=English  F=Family and Consumer Ed.  H=Health  L=Language Arts  M=Math  PE=Physical Education  S=Science  SS=Social Studies  TE=Technological Education
**Awareness - Objectives 4**

Goal: The students will use their 5 senses to develop a deep appreciation for the diversity of environments.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
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</thead>
<tbody>
<tr>
<td>S</td>
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</tbody>
</table>

Describe similarities and differences among three habitats that they observe

Identify similarities and differences between early native Americans and their current lifestyles

Explore the relationships and the philosophies that indigenous cultures had with their environment

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Goal: Students will foster an appreciation for the aesthetic value of the environment.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Practice</th>
<th>Master</th>
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</thead>
<tbody>
<tr>
<td>L, A</td>
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</table>
### Awareness - Objectives 4

**Goal:** To become aware of the relationship between various components of the Earth’s ecosystems.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
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</thead>
</table>

- Recognize that all living things need space and shelter
  - \(S\)
- Become aware of energy relationships in ecosystems
  - \(S\)
- Recognize the difference between renewable and nonrenewable resources
  - \(S\)
- Give examples of how animals have specific adaptations for survival
  - \(M\)
- Recognize that each environment has characteristic life forms and identify the populations found in each
  - \(S, SS\)
- Explore how physical factors, or abiotic factors, influence communities in ecosystems
  - \(S, SS\)
- Identify the basic needs that all living things find necessary for survival
  - \(S\)

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<tr>
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<tbody>
<tr>
<td>Goal: To become aware of the relationship between various components of the Earth's ecosystems.</td>
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Examine how the environment controls wildlife populations by factors of food supply and disease

<table>
<thead>
<tr>
<th>Introduce</th>
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</thead>
<tbody>
<tr>
<td>Reinforce</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Master</td>
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Knowledge - Objectives 4
Goal: Acquire information about the living (biotic) and non-living (abiotic) substances of the natural environment.

<table>
<thead>
<tr>
<th>Compare and contrast renewable and nonrenewable resources</th>
<th>Introduce</th>
<th>Review</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SS</td>
<td>S</td>
<td></td>
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</tbody>
</table>
### Knowledge - Objectives 4

**Goal:** The students will develop an understanding of the interrelationships of the Earth's systems and how they function.

| Recognize that weather results in changes in our environment (i.e. volcanoes) | S, SS |
| Define the various factors that influence the relationships between populations and the environment | S, SS |
| Define succession and list examples stages of it | S |
| Determine how plants and animals that are specialized to a specific environment can be threatened by environmental changes, natural or induced | S, SS |
| Explore how pollutants affect the water cycle and world atmospheric conditions | S, SS, H |

<table>
<thead>
<tr>
<th>A=Art</th>
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<tbody>
<tr>
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<td>S=Science</td>
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</tbody>
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#### Knowledge - Objectives 4

- **Recognize that weather results in changes in our environment (i.e. volcanoes)**
- **Define the various factors that influence the relationships between populations and the environment**
- **Define succession and list examples stages of it**
- **Determine how plants and animals that are specialized to a specific environment can be threatened by environmental changes, natural or induced**
- **Explore how pollutants affect the water cycle and world atmospheric conditions**
### Knowledge - Objectives 4

**Goal:** The students will develop an understanding of human impact and responsibilities relative to the environment.

| Explore how scientists use the scientific method to study environmental problems | S |
| Identify major types of energy and the technology and resources used to produce them | S, SS, H |
| Recognize how dependent we are on any one natural resource | S, SS |
| List the various methods used to conserve natural resources | S, SS |
| Distinguish between safe and unsafe waste disposal and how problems result from improper disposal. | SS, H, S |
| Identify the multiple uses and misuses of land and its resources | S, SS |
| Create a time line of major positive and negative environmental events | SS |

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**Goal:** The students will develop an understanding of human impact and responsibilities relative to the environment.

<table>
<thead>
<tr>
<th>Knowledge - Objectives</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the word aesthetic and explain how it relates to their environment</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify practices of energy conservation at home, in school, or elsewhere</td>
<td>S, SS</td>
<td></td>
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</tr>
<tr>
<td>List ways that some lifestyles have a greater impact upon energy sources than others</td>
<td>SS</td>
<td></td>
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**Attitudes - Objectives 4**

Goal: To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

<table>
<thead>
<tr>
<th>Task</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find relevant facts related to environmental issues and assess whether or not they support or negate particular actions</td>
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<td>S</td>
<td></td>
</tr>
<tr>
<td>Examine and evaluate the accomplishments of significant human models (i.e. Aldo Leopold, Rachel Carson, John Muir, Theodore Roosevelt, etc.)</td>
<td></td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>List different views for making decisions and examine conflicts among them (i.e. ways of disposing of trash; composting, incineration )</td>
<td>S, SS, H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>List reasons for making specific moral choices and listen to the reasons stated by others</td>
<td>S, SS, H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhibit empathy with others holding different value positions represented in a conflict</td>
<td>S, SS, H</td>
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**Skills - Objectives**

**Goal:** Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
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</thead>
<tbody>
<tr>
<td>S, SS, H</td>
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</table>

Show the connection between individual actions and impacts

Research historical background of environmental issues (i.e. DDT)

Identify the roles played by differing human beliefs and values when dealing with a particular environmental issue (i.e., role: loggers/tree cutters, concerned citizens/protectors of forests)

Examine environmental issues from the local and regional of view

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**Abbreviations:**
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- PE=Physical Education  S=Science  SS=Social Studies  TE=Technological Education
### Skills - Objectives 4

**Goal:** Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.

<table>
<thead>
<tr>
<th><strong>Determine number, quantity, quality and value (i.e., interpretation of previously collected data)</strong></th>
<th>Introduce: S, H</th>
<th>Reference:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evaluate sources of information regarding the environment</strong></td>
<td>Introduce: L, S</td>
<td>Reference:</td>
</tr>
<tr>
<td><strong>Pick an ecological concept and use it to predict probable ecological consequences (i.e., increase human population leads to environmental degradation)</strong></td>
<td>Introduce: S, SS, H</td>
<td>Reference:</td>
</tr>
<tr>
<td><strong>Recognize alternative solutions to any environmental problem and compare and contrast the impacts of the solutions</strong></td>
<td>Introduce: S, SS, H, L</td>
<td>Reference:</td>
</tr>
<tr>
<td><strong>Apply critical thinking skills to an environmental issue</strong></td>
<td>Introduce:</td>
<td>Reference:</td>
</tr>
<tr>
<td><strong>Identify categories of consumer action and describe issues for which each category of action is appropriate (i.e., boycotting, non-purchase)</strong></td>
<td>Introduce: S, SS</td>
<td>Reference:</td>
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**Participation - Objectives 4**

Goal: Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.

<table>
<thead>
<tr>
<th>Introduce</th>
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<td>S, SS, H</td>
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</table>

Formulate a debate which allows students to analyze both sides of the issue and draw own conclusions on an environmental issue (i.e. should rural landowners be permitted to subdivide or otherwise destroy productive farmland)

Involves students in persuasive approaches for environmental issues (i.e. posters, debate, boycott, strikes, peaceful demonstrations, marches)

Write a letter to a political figure expressing their view on an environmental issue

Locate an area on school property and have students take actions to make an environmental change which would improve its quality (i.e. improving wildlife habitat, improving conservation practices, school litter clean up.)

Offer students an opportunity to take consumer action on an issue that they feel is important to them personally

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## Awareness - Objectives 5

**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Introduce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brainstorm current environmental issues and consequences</td>
<td>S</td>
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</tr>
<tr>
<td>Recognize how humans and wildlife depend on our environment to provide many basic needs</td>
<td>S, SS</td>
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</tr>
<tr>
<td>Explain the importance of geography in helping people make decisions about environmental concerns at the local level</td>
<td>S, SS</td>
<td></td>
</tr>
<tr>
<td>State that humans share environments with wildlife (flora and fauna) and have a positive or negative impact</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Explore the effects of relationships between technology and environmental issues</td>
<td>S, SS</td>
<td></td>
</tr>
<tr>
<td>Evaluate influential factors that lead to personal awareness of the environment (i.e. going camping, bird watching)</td>
<td>S</td>
<td></td>
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**Awareness - Objectives 5**

| Goal: The students will use their 5 senses to develop a deep appreciation for the diversity of environments. |
|---|---|---|
| Describe similarities and differences among three habitats that they observe | Introduce | SS |
| Identify similarities and differences between early native Americans and their current lifestyles | Refer | SS |
| Explore the relationships and the philosophies that indigenous cultures had with their environment | Master | |

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Awareness - Objectives 5

Goal: Students will foster an appreciation for the aesthetic value of the environment.

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<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Maintain</th>
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<td>S, A, L</td>
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</table>

Identify some aspect of the environment that is found to be personally aesthetic

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<table>
<thead>
<tr>
<th>Awareness - Objectives</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
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<tbody>
<tr>
<td>Goal: To become aware of the relationship between various components of the Earth's ecosystems.</td>
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<td>Recognize the difference between renewable and nonrenewable resources</td>
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<td>Give examples of how animals have specific adaptations for survival</td>
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<td>Recognize that each environment has characteristic life forms and identify the populations found in each</td>
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<tr>
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Goal: To become aware of the relationship between various components of the Earth's ecosystems.

Examine how the environment controls wildlife populations by factors of food supply and disease

Introduce  Reinforce  Master

S

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Goal: Acquire information about the living (biotic) and non-living (abiotic) substances of the natural environment.

Compare and contrast renewable and nonrenewable resources

<table>
<thead>
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<th>Knowledge - Objectives</th>
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**Goal:** The students will develop an understanding of the interrelationships of the Earth’s systems and how they function.

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- Recognize that weather results in changes in our environment (i.e. volcanoes)
- Define the various factors that influence the relationships between populations and the environment
- Define succession and list examples stages of it
- Determine how plants and animals that are specialized to a specific environment can be threatened by environmental changes, natural or induced
- Explore how pollutants affect the water cycle and world atmospheric conditions

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<td>Distinguish between safe and unsafe waste disposal and how problems result from improper disposal</td>
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<td>S, SS, H</td>
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**Objectives 5**

Goal: The students will develop an understanding of human impact and responsibilities relative to the environment.

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<tbody>
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<td>S, A</td>
<td>S, SS, H</td>
<td>H</td>
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Define the word aesthetic and explain how it relates to their environment

Identify practices of energy conservation at home, in school, or elsewhere

List ways that some lifestyles have a greater impact upon energy resources than others
**Attitudes - Objectives 5**

| Goal: Students will develop positive beliefs, attitudes, and values regarding the environment, and to acquire an ethic on which they may act to defend, improve and sustain the quality of the environment. |
|---|---|---|
| Exhibit empathy with others holding different value positions represented in a conflict | SS, H |
| Find relevant facts related to environmental issues and assess whether or not they support or negate particular actions | S, SS |
| Examine and evaluate the accomplishments of significant human models (i.e. Aldo Leopold, Rachel Carson, John Muir, Theodore Roosevelt, etc.) | S, SS, H |
| List different views for making decisions and examine conflicts among them (i.e. ways of disposing of trash; composting, incineration ) | S, H |
| List reasons for making specific moral choices and listen to the reasons stated by others | S, SS, H |

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**Skills - Objectives**

**Goal:** Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

<table>
<thead>
<tr>
<th>Skill Description</th>
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<th>Reinforce</th>
<th>Master</th>
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</thead>
<tbody>
<tr>
<td>Show the connection between individual actions and impacts</td>
<td></td>
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</tr>
<tr>
<td>Research historical background of environmental issues (i.e. DDT)</td>
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<tr>
<td>Identify the roles played by differing human beliefs and values when dealing with</td>
<td></td>
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<tr>
<td>a particular environmental issue (i.e., role: loggers/tree cutters, concerned</td>
<td>S, SS, H</td>
<td></td>
<td></td>
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<tr>
<td>citizens/protectors of forests)</td>
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<tr>
<td>Examine environmental issues from the regional and local point of view</td>
<td>S, SS</td>
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**Skills: Objectives 5**

Goal: Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.

| Determine number, quantity, quality and value (i.e., interpretation of previously collected data) | S, SS, H |
| Evaluate sources of information regarding the environment | S, SS, H |
| Pick an ecological concept and use it to predict probable ecological consequences (i.e., increase human population leads to environmental degradation) | S, SS |
| Recognize alternative solutions to any environmental problem and compare and contrast the impacts of the solutions | L, S, SS, H |
| Apply critical thinking skills to an environmental issue | S, SS |
| Identify categories of consumer action and describe issues for which each category of action is appropriate (i.e. boycotting, non-purchase) | S, SS, H |

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### Participation - Objectives 5

**Goal:** Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward an issue resolution and continued maintenance of the environment.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>S, SS, L</td>
<td>L, SS, S, H</td>
<td>L</td>
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<tr>
<td></td>
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<td>S</td>
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<td></td>
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<td>L, S, SS, H</td>
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</tbody>
</table>

- Formulate a debate which allows students to analyze both sides of the issue and draw own conclusions on an environmental issue (i.e. should rural landowners be permitted to subdivide or otherwise destroy productive farmland)

- Involve students in persuasive approaches for environmental issues (i.e. posters, debate, boycott, strikes, peaceful demonstrations, marches)

- Write a letter to a political figure expressing their view on an environmental issue

- Locate an area on school property and have students take actions to make an environmental change which would improve its quality (i.e. improving wildlife habitat, improving conservation practices, school litter clean-up)

- Offer students an opportunity to take consumer action on an issue that they feel is important to them personally

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**Awareness - Objectives**

Goal: To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize the challenge of dealing with pollution of the environment</td>
<td>S, SS, H</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Distinguish between products which have the least and most impact on the environment</td>
<td>H</td>
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</tr>
<tr>
<td>Explain how personal lifestyles relate to conserving energy</td>
<td>S</td>
<td>A</td>
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</tr>
<tr>
<td>Become aware of the benefits of preserving and managing forests</td>
<td>SS</td>
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<tr>
<td>Recognize that many career opportunities exist in the bioenvironmental area</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Become aware of wildlife management</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To have an awareness of how philosophies and attitudes have an impact on the environment</td>
<td>SS</td>
<td></td>
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</tr>
</tbody>
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### Awareness - Objectives 6

**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

*Investigate how your lifestyle (i.e. wants/needs) impact the environment*

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<th>Reinforce</th>
<th>Master</th>
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</table>

*Examine whether or not their philosophies and attitudes are consistent with their behavior (i.e. Is product convenience more important than its environmental consequence?)*

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**Awareness Objectives**

Goal: The students will use their 5 senses to develop a deep appreciation for the diversity of environments.

<table>
<thead>
<tr>
<th>Observe things in our environment</th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>A</td>
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Goal: Students will foster an appreciation for the aesthetic value of the environment.

<table>
<thead>
<tr>
<th>appreciate the aesthetics of the environmental diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>S, L</td>
</tr>
</tbody>
</table>

A=Art  B=Band  C=Computers  CH=Choir  E=English  F=Family and Consumer Ed.  H=Health  L=Language Arts  M=Math  PE=Physical Education  S=Science  SS=Social Studies  TE=Technological Education
**Goal:** To become aware of the relationship between various components of the Earth’s ecosystems.

Become aware of the complex relationships that exist between populations and their environment

Recognize that natural resources are limited

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<td>SS</td>
<td>SS, M</td>
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</tbody>
</table>
**Knowledge - Objectives**

Goal: Acquire more information about the living (biotic) and the non-living (abiotic) substances of the natural environment.

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<th>Introduce</th>
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<td>Describe the processes of transpiration respiration, how it works and how it relates to the elements cycling within the ecosystem</td>
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**Goal:** The students will develop an understanding of the interrelationships of the Earth's ecosystems and how they function.

- Describe similarities and differences among the various ecosystems (i.e.: freshwater-lakes, ponds and streams-woodland, prairie, wetlands, forests and urban ecosystems)
- Identify the components within an ecosystem (include niches, competition, tolerance ranges, limiting factors and succession)
- Describe energy loss by diagraming food chains and webs

<table>
<thead>
<tr>
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<th>Reinforce</th>
<th>Master</th>
</tr>
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<td>M</td>
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</tr>
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<td>Define ecology and the role of ecologists</td>
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<td>Identify practices of energy conservation at home, in school and elsewhere</td>
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<td>-</td>
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<td>Recognize the uneven distribution of resources globally</td>
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<td></td>
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<td>Describe the relationship between economic, social, political, and ecological interdependence in urban and rural areas</td>
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<td>Explain appropriate time/rate determiners for desired improvements within the environment (i.e., decomposition of banana peels versus the half-life of radioactive materials)</td>
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<td>Describe how modern agriculture (chemical and genetics), industry, space, and forestry and their technologies affect the environment (land, water, and air)</td>
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<td></td>
<td></td>
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**Attitudes - Objectives**

**Goal:** To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Resistance</th>
<th>Mastery</th>
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</thead>
<tbody>
<tr>
<td>A</td>
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<td>S, S, S</td>
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<tr>
<td>S, S</td>
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<td>S, PE</td>
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<td>S</td>
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<td>S, M</td>
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<td>S</td>
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<table>
<thead>
<tr>
<th>Attitudes - Objectives 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal:</strong> To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.</td>
</tr>
<tr>
<td><strong>Perceive that the depletion of the ozone layer is a problem caused and shared by all</strong></td>
</tr>
<tr>
<td>SS, H</td>
</tr>
<tr>
<td><strong>Appreciate the shortcomings and benefits of the natural and synthetic chemicals in our environment and how it effects our health</strong></td>
</tr>
<tr>
<td>S, SS</td>
</tr>
<tr>
<td><strong>Justify air pollution and its detrimental effects and why it should be monitored and controlled</strong></td>
</tr>
<tr>
<td>SS</td>
</tr>
</tbody>
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Skills - Objectives 6

Goal: Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

Determine what action to take on an environmental issue which incorporates personal values and judgment

Articulate personal values on an environmental issue

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**Skills - Objectives 6**

Goal: Learners should analyze, develop, and use problem solving skills to understand decision making processes that contribute to the resolution of environmental issues.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use critical thinking skills to identify point source pollution from ground and surface water</td>
<td>S</td>
<td></td>
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<tr>
<td>Analyze the risks involved when taking environmental action</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Examine environmental issues from local, regional, national, and international points of view</td>
<td>SS</td>
<td></td>
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<tr>
<td>Examine an environmental issue and separate fact from opinion</td>
<td>S</td>
<td></td>
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<tr>
<td>Identify a given environmental persuasive action as an emotional appeal, logical appeal, coercion, or combination of these</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Analyze an environmental issue and explain why an individual should consider all sides before taking any type of action (i.e. persuasion, consumerism, political action, legal action or ecomanagement)</td>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

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Goal: Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working hard toward issue resolution and continued maintenance of the environment.

Write a letter to a political figure expressing the students' views on an environmental issue and possible solutions.

Investigate an environmental issue and decide on an action to implement a solution.
Awareness - Objectives

Goal: To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

- Recognize the challenge of dealing with pollution of the environment
- Distinguish between products which have the least and most impact on the environment
- Explain how personal lifestyles relate to conserving energy
- Become aware of the benefits of preserving and managing forests
- Recognize that many career opportunities exist in the bioenvironmental area
- Become aware of wildlife management
- To have an awareness of how philosophies and attitudes have an impact on the environment

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**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

Investigate how your lifestyle (i.e. wants/needs) impact the environment

Examine whether or not their philosophies and attitudes are consistent with their behavior (i.e. Is product convenience more important than its environmental consequence?)

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<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
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<tbody>
<tr>
<td>SS,</td>
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<td>S,</td>
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<td>S, L</td>
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<td></td>
<td>S, L</td>
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</tbody>
</table>
Goal: The students will use their 5 senses to develop a deep appreciation for the diversity of environments.

<table>
<thead>
<tr>
<th>Introduce</th>
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<tbody>
<tr>
<td>M, A</td>
<td>S</td>
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</table>

Observe things in our environment
**Goal:** Students will foster an appreciation for the aesthetic value of the environment.

<table>
<thead>
<tr>
<th>Introduce</th>
<th>Reinforce</th>
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<td>S, L</td>
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Appreciate the aesthetics of the environmental diversity

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**Awareness - Objectives 7**

Goal: To become aware of the relationship between various components of the Earth's ecosystems.

<table>
<thead>
<tr>
<th></th>
<th>Introduce</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Become aware of the complex relationships that exist between populations and their environment</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognize that natural resources are limited</td>
<td>SS, M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Goal: Acquire information about the living (biotic) and the non-living (abiotic) substances of the natural environment.

<table>
<thead>
<tr>
<th>Knowledge - Objectives 7</th>
<th>Introduce</th>
<th>Relevance</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the individuals and populations within the communities found in WI</td>
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<td>Diagram the stages included in the biogeochemical cycles (i.e.: water, nitrogen and carbon)</td>
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<td>Define the term photosynthesis and how it works tracking the elements involved</td>
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Knowledge - Objectives

Goal: The students will develop an understanding of the interrelationships of the Earth's systems and how they function.

| Describe similarities and differences among the various ecosystems (i.e.: freshwater-lakes, ponds and streams-woodland, prairie, wetlands, forests and urban ecosystems) |
| S, SS |

| Identify the components within an ecosystem (include niches, competition, tolerance ranges, limiting factors and succession) |
| S |

| Describe energy loss by diagraming food chains and webs |
| S |

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**Goal:** The students will develop an understanding of human impact and responsibilities relative to the environment.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Introduce</th>
<th>Explore</th>
<th>Master</th>
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<tbody>
<tr>
<td>Define ecology and the role of ecologists</td>
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<tr>
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</tr>
<tr>
<td>Recognize the consequences of individual actions and appropriate measures to critically and creatively solve problems that may arise (i.e. consumerism)</td>
<td>S, SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compare and contrast how human cultural activities influence the environment from an ecological perspective</td>
<td>S, SS</td>
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Knowledge - Objectives 7

Goal: The students will develop an understanding of human impact and responsibilities relative to the environment.

Describe how modern agriculture (chemical and genetics), industry, space, and forestry and their technologies affect the environment (land, water, and air)

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**Attitudes - Objectives**

Goal: To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

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<th>Objective</th>
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<tbody>
<tr>
<td>Justify air pollution and its detrimental effects and why it should be monitored and controlled</td>
<td></td>
<td>S, F</td>
<td></td>
</tr>
<tr>
<td>Assess the sources, causes, and effects of water pollution that are shared by all things in our environment</td>
<td>S, SS, TE, F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Justify that energy conservation is one solution to insuring energy sources for the future</td>
<td></td>
<td>S, M</td>
<td></td>
</tr>
<tr>
<td>Realize that there are consequences for not managing waste properly</td>
<td></td>
<td>M, S</td>
<td></td>
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<tr>
<td>Perceive that the depletion of the ozone layer is a problem caused and shared by all</td>
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<td>S, SS</td>
<td></td>
</tr>
<tr>
<td>Predict the quality of personal health as related to the health of the environment (i.e. coal miners &amp; black lung)</td>
<td>S, F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess different land use practices and how they affect the environment (i.e. farming, urban sprawl)</td>
<td>SS, S</td>
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**Attitudes - Objectives**

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<th>Introduction</th>
<th>Reinforcement</th>
<th>Mastery</th>
</tr>
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- Recognize that the quality of life may be enriched by an aesthetic environment
- Realize that the health of rural and urban areas are effected by the growth of urban sprawl
- Deduce that their population is dependent on the decisions they make concerning other population and the environment (i.e. How many emigrants do we allow in our country? or Animal wolves and deer)
- Make personal judgments about the appropriateness of their environmental decisions
- Empathize with others holding different environmental value positions represented in conflict
- Appreciate the value of the environment as used for recreation
- Consider the value of a clean environment and how this will influence decisions they will make regarding the use of alternative energy technologies

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A=Art  B=Band  C=Computers  CH=Choir  E=English  F=Family and Consumer Ed.  H=Health  L=Language Arts  M=Math
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Attitudes - Objectives

<table>
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<tr>
<th>Attitudes - Objectives</th>
<th>Introduce</th>
<th>Reference</th>
<th>Master</th>
</tr>
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**Goal:** To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

Appreciate the shortcomings and benefits of the natural and synthetic chemicals in our environment and how it effects our health.

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**Goal:** Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

<table>
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<tr>
<th>Skill</th>
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<tbody>
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<td></td>
<td>Determine what action to take on an environmental issue which incorporates personal values and judgment</td>
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<tr>
<td></td>
<td>Articulate personal values on an environmental issue</td>
<td>S, L, M</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluate, clarify, and change personal values positions in light of new information, if necessary</td>
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**Skills - Objectives**

**Goal:** Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues.

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<tr>
<th>Introduce</th>
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<th>Master</th>
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<tbody>
<tr>
<td>SS, S, L</td>
<td>S, L</td>
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</table>

Examine environmental issues from local, regional, national, and international points of view

Examine an environmental issue and separate fact from opinion

Describe political actions and discuss how they may be applied effectively to environmental issues

Identify a given environmental persuasive action as an emotional appeal, logical appeal, coercion, or combination of these

Analyze an environmental issue and explain why an individual should consider all sides before taking any type of action (i.e. persuasion, consumerism, political action, legal action or ecomanagement)

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**A=Art  B=Band  C=Computers  CH=Choir  E=English  F=Family and Consumer Ed.  H=Health  L=Language Arts  M=Math  PE=Physical Education  S=Science  SS=Social Studies  TE=Technological Education**
**Participation - Objectives 7**

| Goal:  Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment. |
|--------|----------|--------|
| **Write a letter to a political figure expressing the students views on an environmental issue and possible solutions** |  | L, S |
| **Target an environmental issues in your area that requires students to take ecomanagement actions** |  | S |
| **Investigate an environmental issue and decide on an action to implement a solution** |  | S |

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**Awareness - Objectives**

**Goal:** To help students develop an awareness and sensitivity to the environment and its problems and how their individual behavior affects it.

- Recognize the challenge of dealing with pollution of the environment
- Distinguish between products which have the least and most impact on the environment
- Explain how personal lifestyles relate to conserving energy
- Become aware of the benefits of preserving and managing forests
- Recognize that many career opportunities exist in the bioenvironmental area
- To have an awareness of how philosophies and attitudes have an impact on the environment
- Investigate how your lifestyle (i.e. wants/needs) impact the environment

<table>
<thead>
<tr>
<th>Awareness - Objectives</th>
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<th>Master</th>
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<tbody>
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<td>H, A</td>
<td>S, TE, F</td>
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<td>M, S</td>
<td>S, TE, F</td>
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<td></td>
<td>S, SS</td>
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*A = Art  B = Band  C = Computers  CH = Choir  E = English  F = Family and Consumer Ed.  H = Health  L = Language Arts  M = Math  PE = Physical Education  S = Science  SS = Social Studies  TE = Technological Education*
Examine whether or not their philosophies and attitudes are consistent with their behavior (i.e. Is product convenience more important than its environmental consequence?)

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### Awareness - Objectives 8

**Goal:** The students will use their 5 senses to develop a deep appreciation for the diversity of environments.

| Observe things in our environment | TE, A, S |

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**Abbreviations:**
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- CH = Choir
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- H = Health
- L = Language Arts
- M = Math
- PE = Physical Education
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**Awareness - Objectives 8**

**Goal:** Students will foster an appreciation for the aesthetic value of the environment.

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Proficiency</th>
<th>Mastery</th>
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</thead>
<tbody>
<tr>
<td><strong>S, A, L</strong></td>
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</table>

Appreciate the aesthetics of the environmental diversity

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**Awareness - Objectives**

**Goal:** To become aware of the relationship between various components of the Earth's ecosystems.

<table>
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<tbody>
<tr>
<td>S, F, TE, M</td>
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- Recognize that natural resources are limited
- Become aware of the complex relationships that exist between populations and their environment

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Knowledge - Objectives

<table>
<thead>
<tr>
<th>Subject</th>
<th>Teach</th>
<th>Reinforce</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal: Acquire information about the living (biotic) and the non-living (abiotic) substances of the natural environment.</td>
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<tr>
<td>Diagram the stages included in the biogeochemical cycles (i.e.: water, nitrogen and carbon)</td>
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<td>S</td>
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</tr>
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**Knowledge - Objectives**

**Goal:** The students will develop an understanding of human impact and responsibilities relative to the environment.

| Identify practices of energy conservation at home, in school and elsewhere | M, C, S, TE |
| Describe the relationship between economic, social, political, and ecological interdependence in urban and rural areas | S |
| Explain appropriate time/rate determiners for desired improvements within the environment (i.e. decomposition of banana peels versus the half-life of radioactive materials) | S |
| Recognize the consequences of individual actions and appropriate measures to critically and creatively solve problems that may arise (i.e. consumerism) | M, S |
| Compare and contrast how human cultural activities influence the environment from an ecological perspective | SS |
| Describe how modern agriculture (chemical and genetics), industry, space, and forestry and their technologies affect the environment (land, water, and air) | S |

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<td>S = Science</td>
<td>SS = Social Studies</td>
<td>TE = Technological Education</td>
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**Attitudes - Objectives**

**Goal:** To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

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<tr>
<td>A, F, S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S, A, S</td>
<td>F</td>
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<td></td>
<td>M, S</td>
<td>F</td>
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<tr>
<td></td>
<td>M, S, F, PE</td>
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- Recognize that the quality of life may be enriched by an aesthetic environment
- Realize that the health of rural and urban areas are effected by the growth of urban sprawl
- Deduce that their population is dependent on the decisions they make concerning other population and the environment (i.e. How many emigrants do we allow in our country? or Animal wolves and deer)
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</thead>
<tbody>
<tr>
<td>Justify air pollution and its detrimental effects and why it should be monitored and controlled</td>
</tr>
<tr>
<td>Assess the sources, causes, and effects of water pollution that are shared by all things in our environment</td>
</tr>
<tr>
<td>Justify that energy conservation is one solution to insuring energy sources for the future</td>
</tr>
<tr>
<td>Realize that there are consequences for not managing waste properly</td>
</tr>
<tr>
<td>Perceive that the depletion of the ozone layer is a problem caused and shared by all</td>
</tr>
<tr>
<td>Predict the quality of personal health as related to the health of the environment (i.e. coal miners &amp; black lung)</td>
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<tr>
<td>Assess different land use practices and how they affect the environment (i.e. farming, urban sprawl)</td>
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**Attitudes - Objectives 6**

Goal: To develop positive beliefs, attitudes and values regarding the environment, and to acquire an ethic on which they may act to defend, improve, and sustain the quality of the environment.

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Appreciate the shortcomings and benefits of the natural and synthetic chemicals in our environment and how it effects our health.

Appreciate the differences and similarities of man-made and natural radioactive isotopes, the benefits and consequences of their being introduced into our environment through human activities, and its' effect on our health.

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Goal: Learners should analyze, develop, and use problem solving skills to understand the decision making processes that contribute to the resolution of environmental issues and problems.

Use critical thinking skills to identify point source pollution from ground and surface water

Analyze the risks involved when taking environmental action

Examine an environmental issue and separate fact from opinion

Acknowledge the existence of EPA and OSHA regulations and how they affect the environment

Describe political actions and discuss how they may be applied effectively to environmental issues.

Analyze an environmental issue and explain why an individual should consider all sides before taking any type of action (i.e. persuasion, consumerism, political action, legal action or ecomanagement)
Students will gain experience applying acquired environmental awareness, knowledge, and citizen action skills in working toward issue resolution and continued maintenance of the environment.

Target an environmental issue in your area that requires students to take ecomanagement actions

Investigate an environmental issue and decide on an action to implement a solution
Glossary of Environmental Education Terms

abiotic- non-living; an abiotic variable in an ecosystem would be exemplified by such things as light, rain, moisture, heat, bedrock and topography.

aesthetic- pleasing to the senses as opposed to useful or scientific

biotic- living organisms make up the biotic parts of ecosystems.

community- populations of all species living and interacting in an area at a particular time.

conservation- the preserving of natural resources for economical use; specifically, the preservation of forests, fisheries, harbors, etc.

conservationist- people who believe resources should be used, managed, and protected so they will not be degraded and unnecessarily wasted and will be available to present and future generations.

ecosystem- an aggregate of plants and animals which are interdependent plus the abiotic variables with which they interact; typically thought of as self-contained in the sense that many of the essentials for life can be cycled and recycled within that system.

environmental issue- a problem with various environmental overtones surrounding it, which one can observe differing human beliefs and values.

environmentalist- people who are primarily concerned with preventing pollution and degradation of the air, water, soil, and Earth's biodiversity.

fauna- the animals living within a given area or environment or during a stated period.

flora- plants indigenous to a country or district.
indigenous- originating in a specified place or country.

preservation- to keep in safety; protect from destruction, loss, death or detriment.

succession- process by which communities of plant and animal species in a particular area are replaced over time by a series of different and usually more complex communities.
TWO HATS
by John Hug

It would appear environmental educators have a bad case of the “two hats” problem. We have come by the problem naturally and therefore, we have paid little attention to it.

The problem is simply that industry, utilities, labor, business, media and other segments of the population and the general public have consistently recognized only one hat when talking about environmentalists and environmental educators. It is not uncommon for dedicated environmental educators to be summarily dismissed as trouble makers—environmentalists. This one hat view is easily explained because environmental educators are almost always environmentalists. Perhaps definitions will help clarify the problem.

Any world citizen who advocates with greater or lesser action that wrongs against our environment must be stopped is an environmentalist. Perhaps the negative reputation environmentalists have stems from the dramatic and radical actions of a few.

An environmental educator, on the hand, is any world citizen who uses information and educational processes to help people analyze the merits of the many and varied points of view usually present on a given environmental issue. The environmental educator is not the “mediator,” “trade-off specialists” or “negotiator,” but a developer of skills and an information analyst who prepares the people (from any segment of the population) who will participate in environmental decision making.

Environmental educators, therefore, need to be as “value fair” or “value free” as they can when working in this role. They must scrupulously strive to get all facts, examine and illustrate all the viewpoints, and keep from letting their own particular position (as an environmentalist) from mixing with their educator role.

My suggestion is simply that environmental educators make an effort to clarify the two distinct roles. At every opportunity, we should emphasize the neutral nature of environmental education activity. Strong advocates are all around us, each using the techniques of persuasion and propaganda to build their constituencies. We must ourselves be familiar with all sides, stand firm for each advocate’s right to be heard and provide a rational stage for informed debate.

Environmental educators have the right and the duty to be environmentalists, but the dual roles must adhere to the original premise—to keep each hat on its proper head, while utilizing to the fullest the professional skills of the environmental educators.